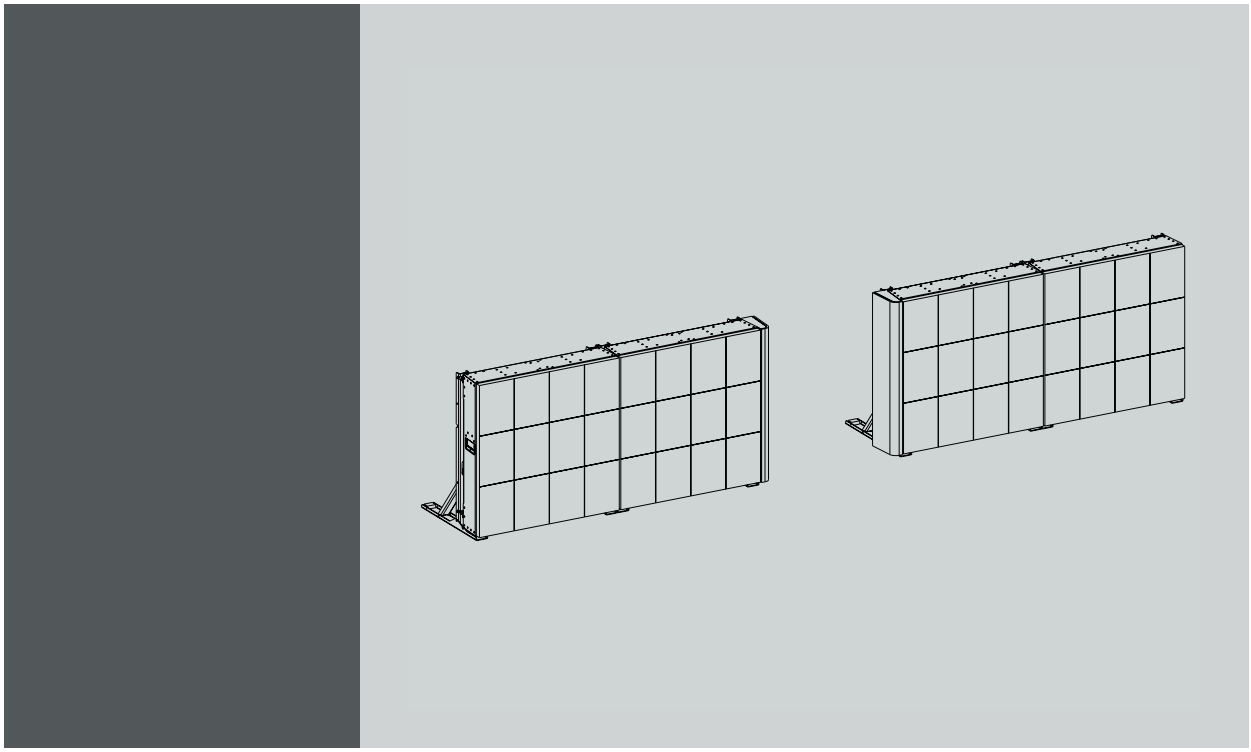
SP-20



Service Manual

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17/03/2009

BARCO

Visibly yours

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1. SAFETY

About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while servicing an SP-20display on-site. Furthermore, it includes several cautions to prevent damage to the SP-20 tile. Ensure you understand and follow all the safety guidelines, safety instructions and warnings mentioned in this chapter before performing any servicing on the SP-20 display. After this chapter additional “warnings” and “cautions” are given depending on the servicing procedure. Read and follow these “warnings” and “cautions” as well.

Overview

- Servicing safety instructions

1.1 Servicing safety instructions

WARNING: Servicing must be done by authorized and qualified technical personnel only, which are thoroughly familiar with the product and all of the proper safety checks of this product.

Personal protection

WARNING: Ensure you understand and follow all the safety guidelines, safety instructions, warnings and cautions mentioned in this manual.

WARNING: Be aware of suspended loads.

WARNING: Wear a hard hat to reduce the risk of personal injury.

WARNING: Be careful while working with heavy loads.

WARNING: Mind your fingers while working with heavy loads.

Safety precautions:

- Follow all servicing and safety instructions mentioned in the servicing procedures.
- Unplug the tile AC power cord from the AC power source and wait about 10 minutes before start any servicing to the tile. This to allow the capacitors to discharge.
- Some boards contains electrostatically sensitive devices (ESD). Take the necessary precautions to prevent the incidence of component damage caused by static electricity.
- Do not modify and/or replicate any component. Barco uses specific materials and manufacturing processes in order to achieve part strength. No other parts then Barco parts are allowed.

Additional on-site servicing safety precautions:

- Fence off a restricted area of at least 3 meters around the LED-wall using an eye-catching fence and “KEEP OUT” signs. This to prevent unauthorized persons coming near the LED-wall during servicing.
- Inspect the complete LED-wall for security, wear, deformation, corrosion, and any other circumstances that may effect the load handling capability of the part.
- Both hands must be free for servicing tiles in a LED-wall. Therefore the use of a ladder to access a tile is forbidden. Only the use of a scaffold or a Z-lift is allowed.
- Do not use the stacker system of the LED-wall to climb into the display. Always use a scaffold or Z-lift to perform any servicing or repairing to the display.
- In case of removing an LED module out of a tile, ensure the module is secured with a safety cable to the LED-wall structure.
- Take the necessary precautions to prevent water intrusion inside the lie due to weather conditions.

2. GENERAL INFORMATION

About this chapter

This chapter gives an overview of all the parts inside a SP-20 tile and the internal connections between the different boards. Futhermore, a list is given with all the available spare parts and service kits.

Overview

- Service components of a SP-20 tile
- Re-sync/controller unit connections
- Internal wiring diagram of a SP-20 tile
- Startup sequence of an SP-20 display system
- Spare part and service kits

2.1 Service components of a SP-20 tile

Service components of a SP-20 tile

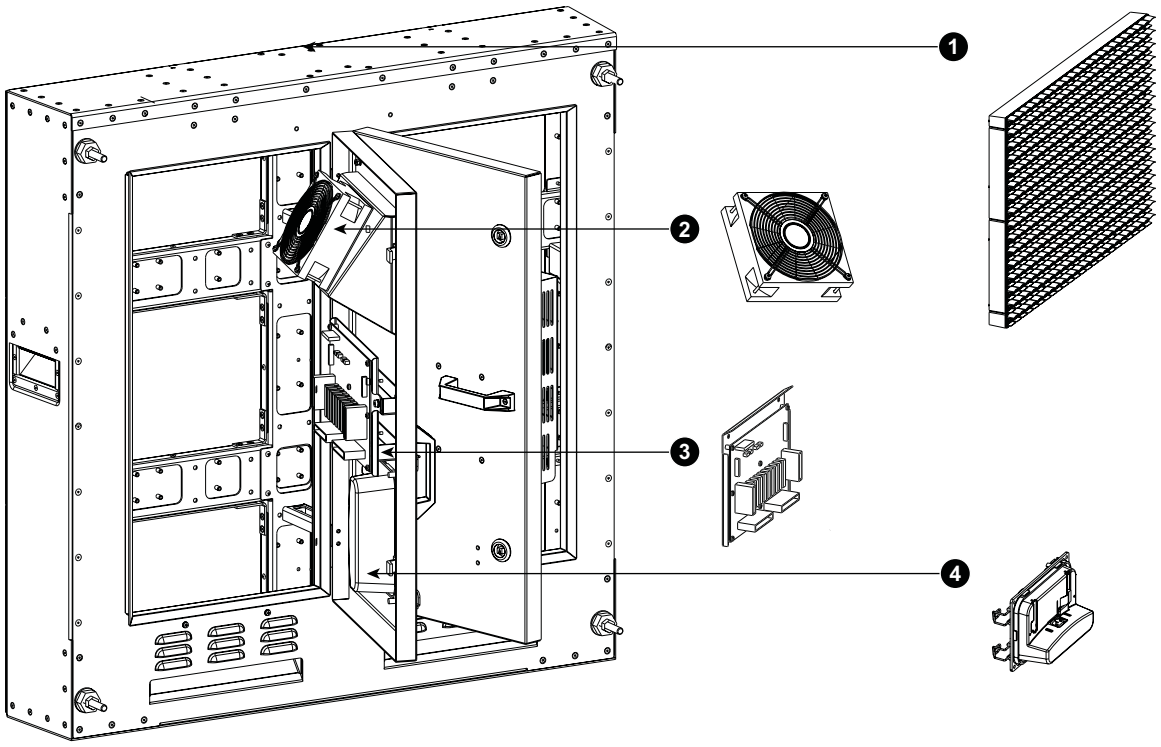


Image 2-1
1 LED-FRAME
2 External fan with dust filter
3 PDB(Power Distribution Board)
4 Re-sync/controller unit

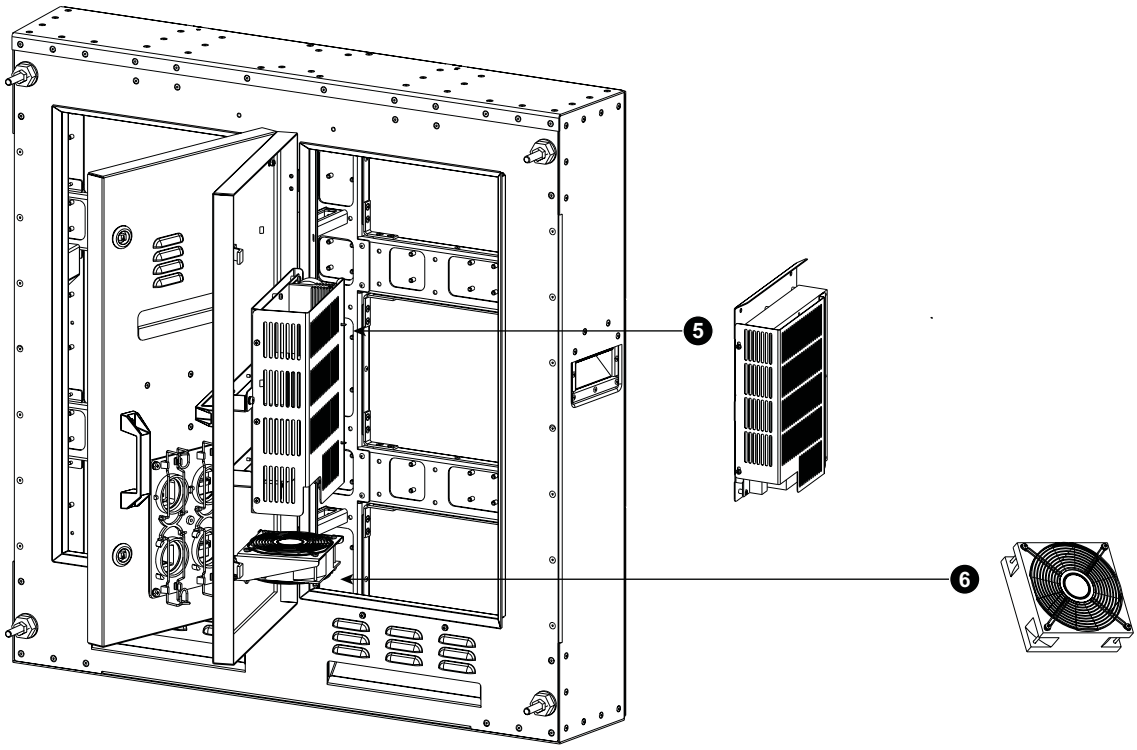


Image 2-2
5 PSU(Power Supply Unite)
6 Internal fan

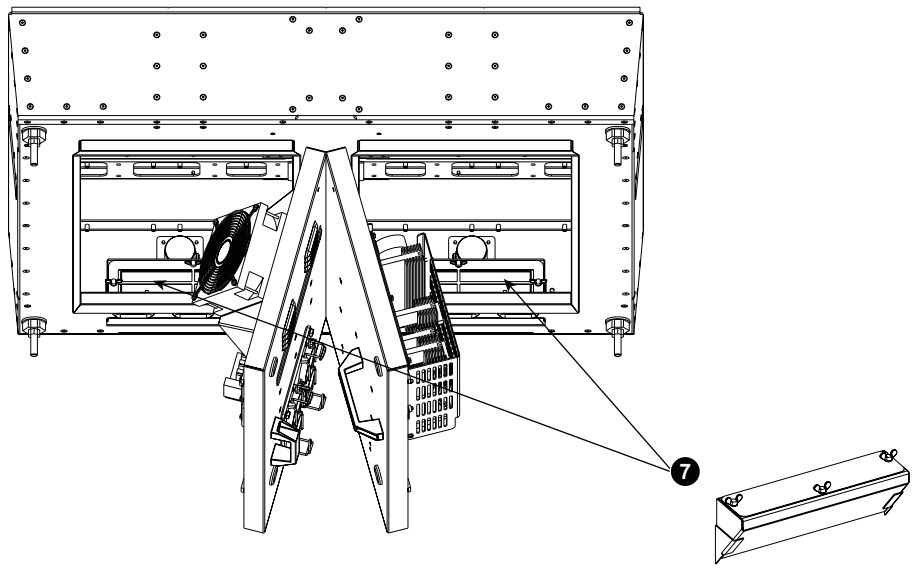


Image 2-3
7 Dustfilter

2.2 Re-sync/controller unit connections

Re-sync/controller unit connections

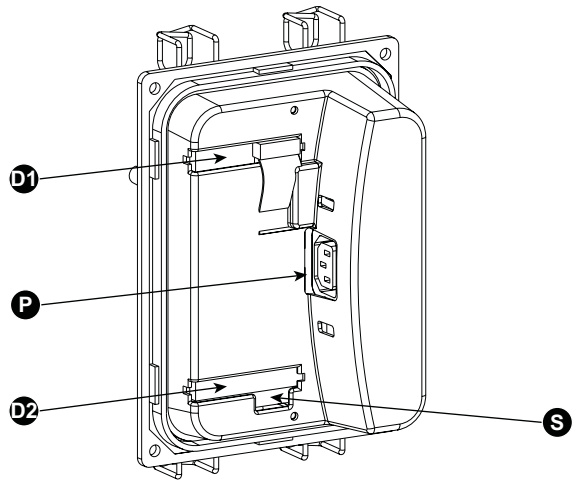


Image 2-4

D1 Data socket 1 SP-20 re-sync/controller unit
P Main power socket
D2 Data socket 2 SP-20 re-sync/controller unit
S Low voltage supply socket of the SP-20 re-sync/controller unit

2.3 Internal wiring diagram of a SP-20 tile

SP-20 tile wiring diagram

Internal wiring between LED-frames, controller and power distribution unit

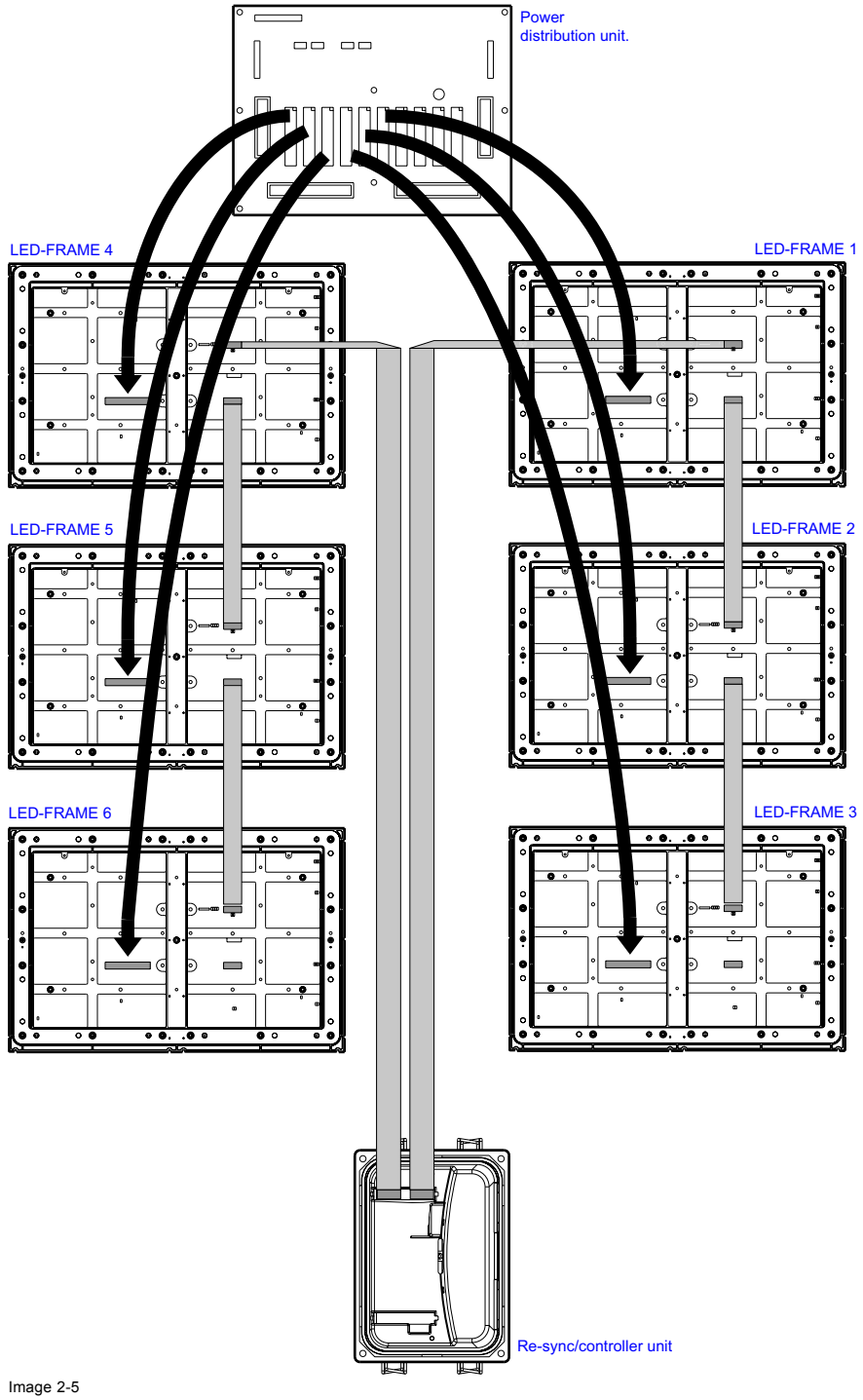


Image 2-5

Fan connections of a SP-20 tile

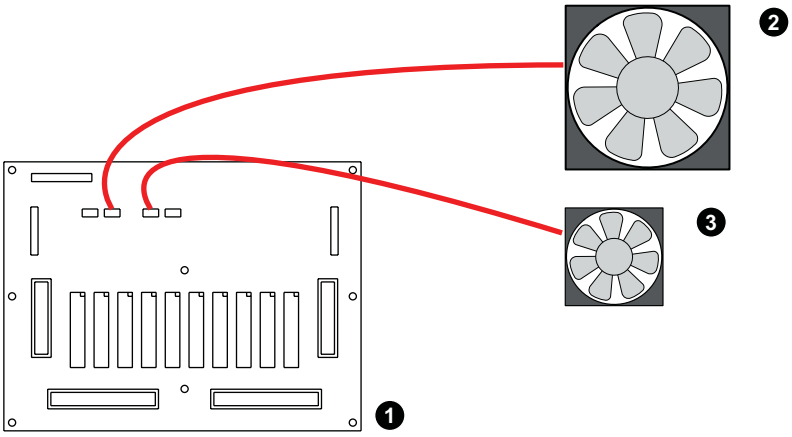


Image 2-6

1 PDB (Power Distribution Board)
2 External fan
3 Internal fan

2.4 Startup sequence of an SP-20 display system

The first two steps of the startup sequence are done manually.

Startup sequence:

1. Switch on the main power to the SP-20 tiles.
   Note: *Nothing happens yet.*
2. Power up the digitizer.
   - The digitizer generates a START signal for the first tile.
   - The digitizer places video content, of the last selected input slot, on the data line to the LED display.
3. The START signal triggers the re-sync/controller unit of the first tile to start up on the line voltage provided on the data cable.
   - The re-sync/controller unit transfers the START signal to an ON signal for the local SMPS.
   - The green LED on the re-sync/controller unit remains off.
   - The red LED on the re-sync/controller unit will only light up in case there is no video content present on the incoming data line.
   - The re-sync/controller unit delays the START signal about half a second before sending it to the next tile. This is necessary to reduce the inrush current of the complete SP-20 display. This delayed START signal will activate the next tile and so on.
4. The ON signal from the re-sync/controller unit triggers the local SMPS to start up.
   - The internal fans starts to turn.
5. The power distribution unit starts up.
   - The power distribution unit generates +15V and +8V.
   - The +15V red LED and the +8V red LED goes on.
6. The controller starts up.
   - The controller generates the local +5V and the local +8V line voltage.
   - The +5V red LED on the controller unit goes on.
   - The local +8V line voltage supports the line voltage on the data cable to supply the resync-unit.
7. The controller unit starts to initialize.
   - The yellow LED on the controller unit lights up continuously.
   - The green LED(s) on the controller unit starts lighting up after the FPGA(s) are configured.
   - The Yellow LED on the controller unit starts to flash (half a second on, half a second off) indicating the controller is completely and correctly initialized.
8. The LED driver receives data from the controller.
   - The yellow LED on the LED drivers goes on.
9. The SP-20 tile shows video content.

2.5 Spare part and service kits

General

Barco provides several kits for servicing SP-20 tiles. Below you find an order list of existing spare part and service kits. In the future new kits can be added to this list. Contact Barco to get an updated list.

Order info	Description
B3247061K	Internal fan kit
B3247071K	External fan kit
R7665001K	LED-frame kit
R838024K	Shader repair kit
B362804K	Screw kit
R838004K	Dust filter kit
R837030K	PDB (Power Distribution Kit)
R837027K	PSU (Power Supply Unit) kit
R857574K	Re-sync/controller unit kit
R861775K	Tooling kit Contains all, standard and SP-20 specific, tools required for optimal installation and servicing.
Z3472067K	SP-20 Data cable kit
Z3472142K	SP-20 Power cable kit

3. DIAGNOSTICS

About this chapter

This chapter helps you to understand the status of the SP-20 Re-sync/controller unit and describes how to start up the SP-20 power unit manually. With this procedure you can check the good working condition of the power unit.

Overview

- SP-20 re-sync unit diagnostic
- Manual startup of the PSU

3.1 SP-20 re-sync unit diagnostic

Status LED's on the re-sync unit

The re-sync unit is provided with a yellow and a green status LED. These status LED's are visible through the data output port of the re-sync unit, see illustration below. Note that you have to unplug the data output of the re-sync unit to see the LED's.

The controller and re-sync circuits are built on the same PCB board of the re-sync unit. The controller firmware and controller software include the functionality of the re-sync unit. So, the SP-20 does not have a separate firmware file for the re-sync unit.

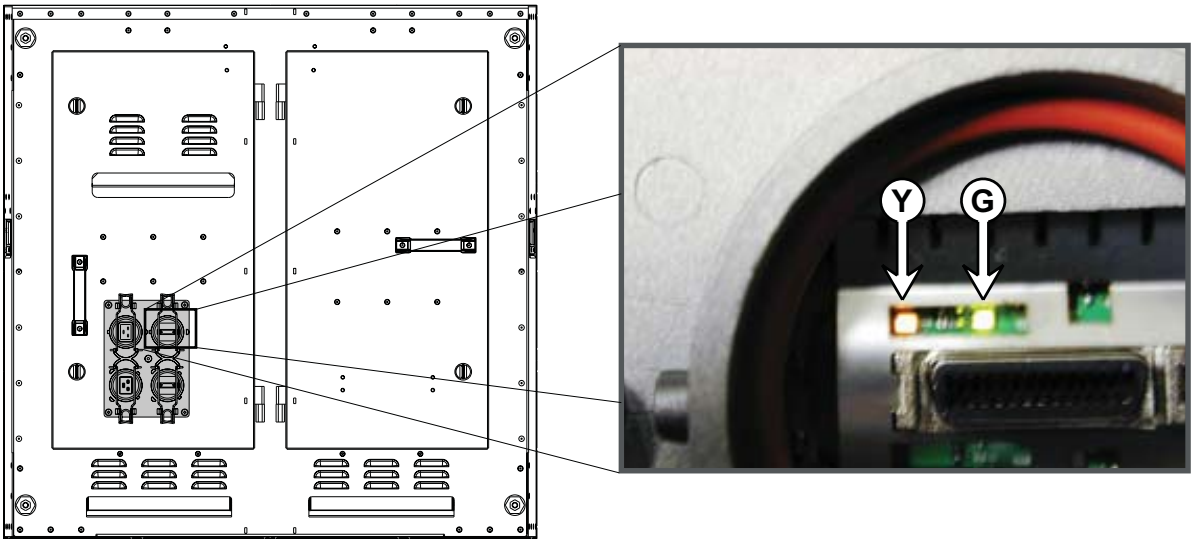


Image 3-1

Y Yellow colored status LED
G Green colored status LED

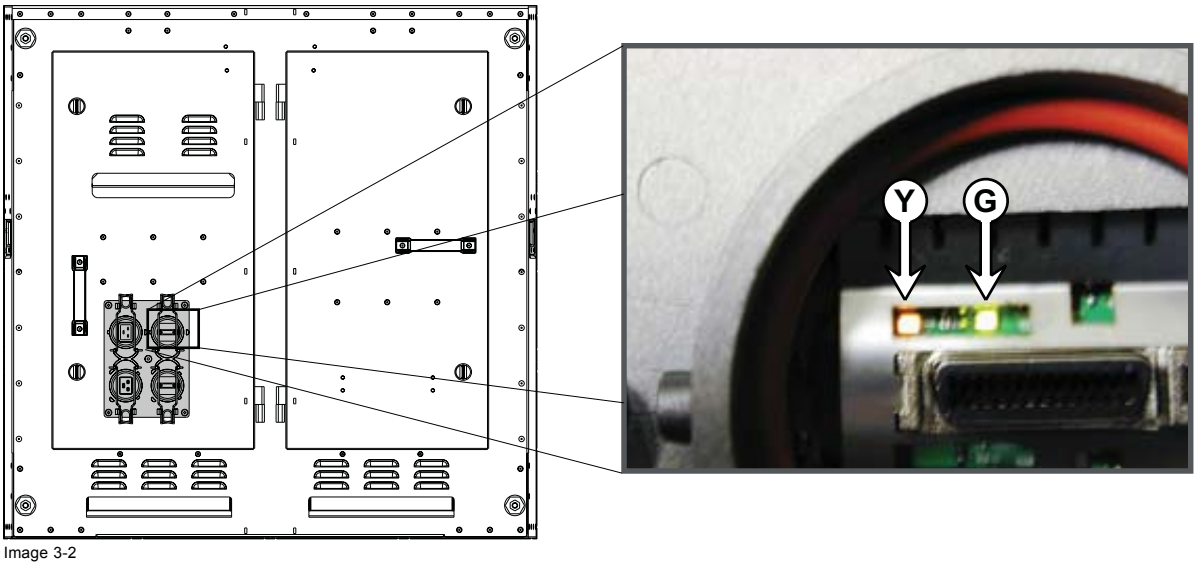
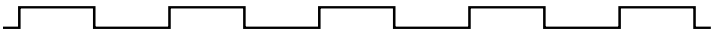
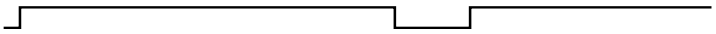


Image 3-2

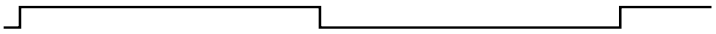
- Reference **G** : Green LED indicating the status of the FPGA. Remains OFF until the FPGA is programmed correctly. Continuous ON during normal operation.
- Reference **Y**: Yellow LED indicating the status of the processor. The flash pattern of the yellow LED indicates five different statuses of the processor.

  a) Flash pattern: 
  Normal operation of the processor. (0.5 second ON — 0.5 second OFF)

  b) Flash pattern:
  Processor is running in boot mode because of incorrect main program file. The software of the controller must be updated. See user guide of the control software (e.g. Director toolset) for further instructions on how to update the software of the controller. Note that when the processor is running in boot mode it is impossible to update the firmware of the controller. (0.1 second ON — 0.1 second OFF)

  c) Flash pattern: 
  Error in configuration of FPGA: Configuration done but configuration status of FPGA not correct. The firmware of the controller must be updated. See user guide of the control software (e.g. Director toolset) for further instructions on how to update the firmware of the controller. (2.5 seconds ON — 0.5 second OFF)

  d) Flash pattern:
  Error in configuration of FPGA: Configuration done but watchdog FPGA is not functioning. The firmware of the controller must be updated. See user guide of the control software (e.g. Director toolset) for further instructions on how to update the firmware of the controller. (0.1 second ON — 0.1 second OFF — 0.1 second ON — 2 seconds OFF)

  e) Flash pattern: 
  Error in configuration of FPGA: FPGA is configured with backup file. Tile gives image, but OSD message “firm backup” remains on screen until any other OSD command is given by the control software (e.g. Director toolset). The firmware of the controller must be updated. See user guide of the control software for further instructions on how to update the firmware of the controller. (2 seconds ON — 2 seconds OFF)

3.2 Manual startup of the PSU

Why starting up the PSU manually?

To determine the cause of a malfunction SP-20 tile it can be very interesting to exclude the possibility of a bad function PSU. Normally the PSU receives a 'START' signal from the Re-sync/controller unit via the power distribution unit. When this signal does not reach the PSU, because for example a malfunction Re-sync/controller unit, the PSU does not start up.

WARNING: Never install a SP-20 tile permanently with a jumper link on J6

WARNING: RISK OF ELECTRIC SHOCK. First, always disconnect the main power before initializing this procedure. This procedure can only be performed by experienced service personnel!

Necessary tools

Flat screwdriver.

Necessary parts

Jumper link.

How to startup the PSU manually?

1. Place a jumper link on J6 of the PSU.

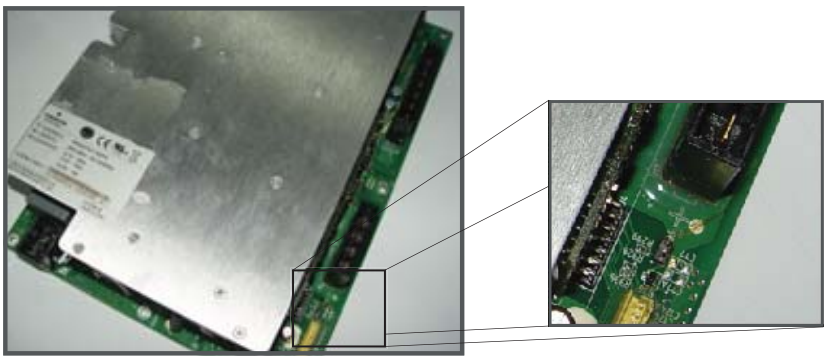


Image 3-3

2. Power up the PSU.
3. Determine the good or bad operation of the PSU.
4. Remove the jumper link from where you placed it in step 2.

4. TROUBLESHOOTING

About this chapter

In this chapter you will find several troubleshooting check lists each time based on a certain phenomenon of the SP-20 display. For every situation a solution is given. Always start with the first row of the troubleshooting check list and continue with the next row until the problem is solved. Contact Barco in case the problem remains after completing the full list.

Overview

- No or bad image on SP-20 frame(s)
- No image on a part of the SP-20 display
- No image on the SP-20 display

4.1 No or bad image on SP-20 frame(s)

Troubleshooting check list

Situation	Possible reason
No output / black frame(s).	1. Loose DC and/or LVDS cable connection.
One / several frame(s) has / have bad image.	1. An analog correction value is incorrect. (Control software: Re-send or display on/off function). 2. Incorrect tile type. (Control software: re-initialize function) 3. A window position is incorrect. (Control software: re-initialize function) 4. Loose DC and/or LVDS cable connection.
One or two colors is missing.	1. Loose DC and/or LVDS cable connection. 2. One or more frame(s) failed.

4.2 No image on a part of the SP-20 display

Troubleshooting check list

Situation	Possible reason
No output (black tile units).	1. Loose cable connection. 2. The PSU failed. 3. The PDB failed. 4. The controller failed.

4.3 No image on the SP-20 display

Troubleshooting check list

Situation	Possible reason
The display doesn't light on.	1. No power supply. 2. The digitizer failed. 3. The connection between the digitizer and the display is incorrect.
The display has a bad image.	1. The digitizer failed. 2. The connection between the digitizer and the display is incorrect.
The display brightness doesn't match the ambient brightness.	1. Incorrect connection of the external AEC cable. 2. AEC failed.

5. BEFORE YOU START

WARNING: Read this chapter attentively before you start at the servicing of the SP-20 display.

Required tools

- TorxT15.
- Small flat screwdriver.
- Small Phillips head screwdriver.
- Adhesive tape.
- Marker pen.

Overview

- Service procedure inside this manual
- Opening the cabinet doors
- Disconnecting cables
- Reconnecting cables

5.1 Service procedure inside this manual

About this manual

In order to avoid a complex and thick manual, service on the SP-20 tile will always be explained from a point of view on the cabinet doors. As most of the serviceable components are installed on the cabinet doors, the service method of a front or back accessible tile is the same. This method will also improve the clearness of the used illustrations.

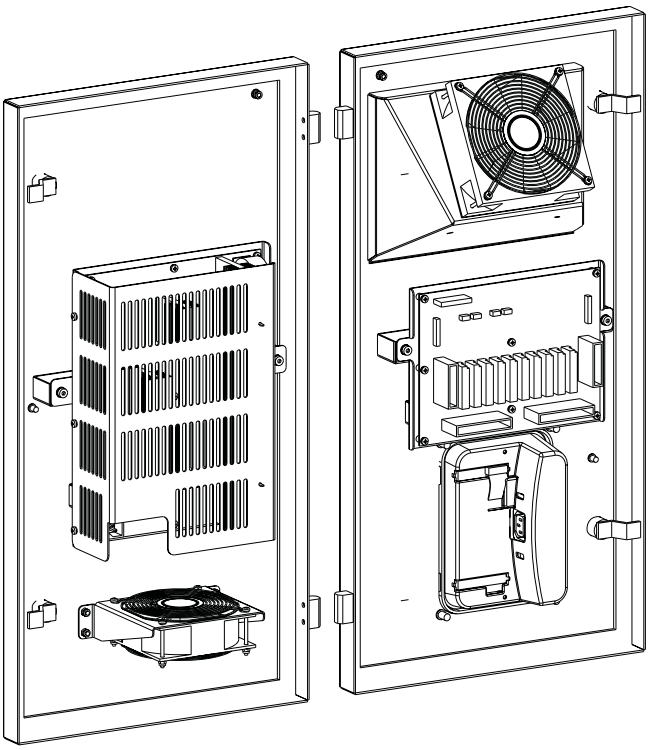


Image 5-1

5.2 Opening the cabinet doors

How to open the cabinet doors?

Each door is equipped with two locks which can easily and quickly be opened by hand.

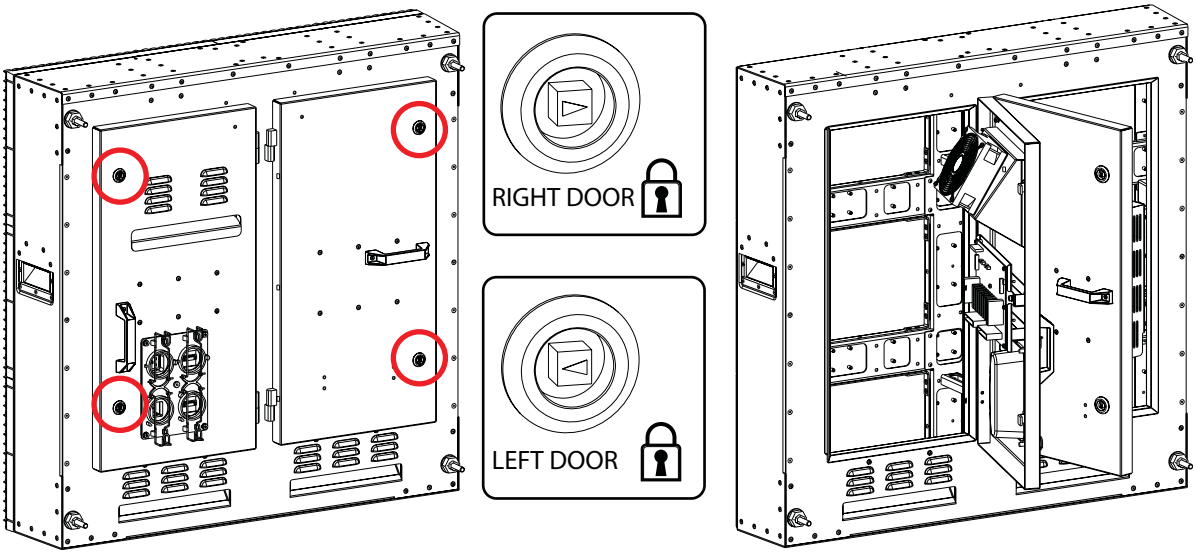


Image 5-2

5.3 Disconnecting cables

Disconnecting cables

Before disconnecting cables it is strongly recommended to mark the cables. Use a piece of adhesive tape and write down the position on the component or the name mentioned on the slot from where you are going to disconnect the cable. Stick the adhesive tape around the cable and then disconnect it from the component.

This method will simplify and speed up the maintenance.

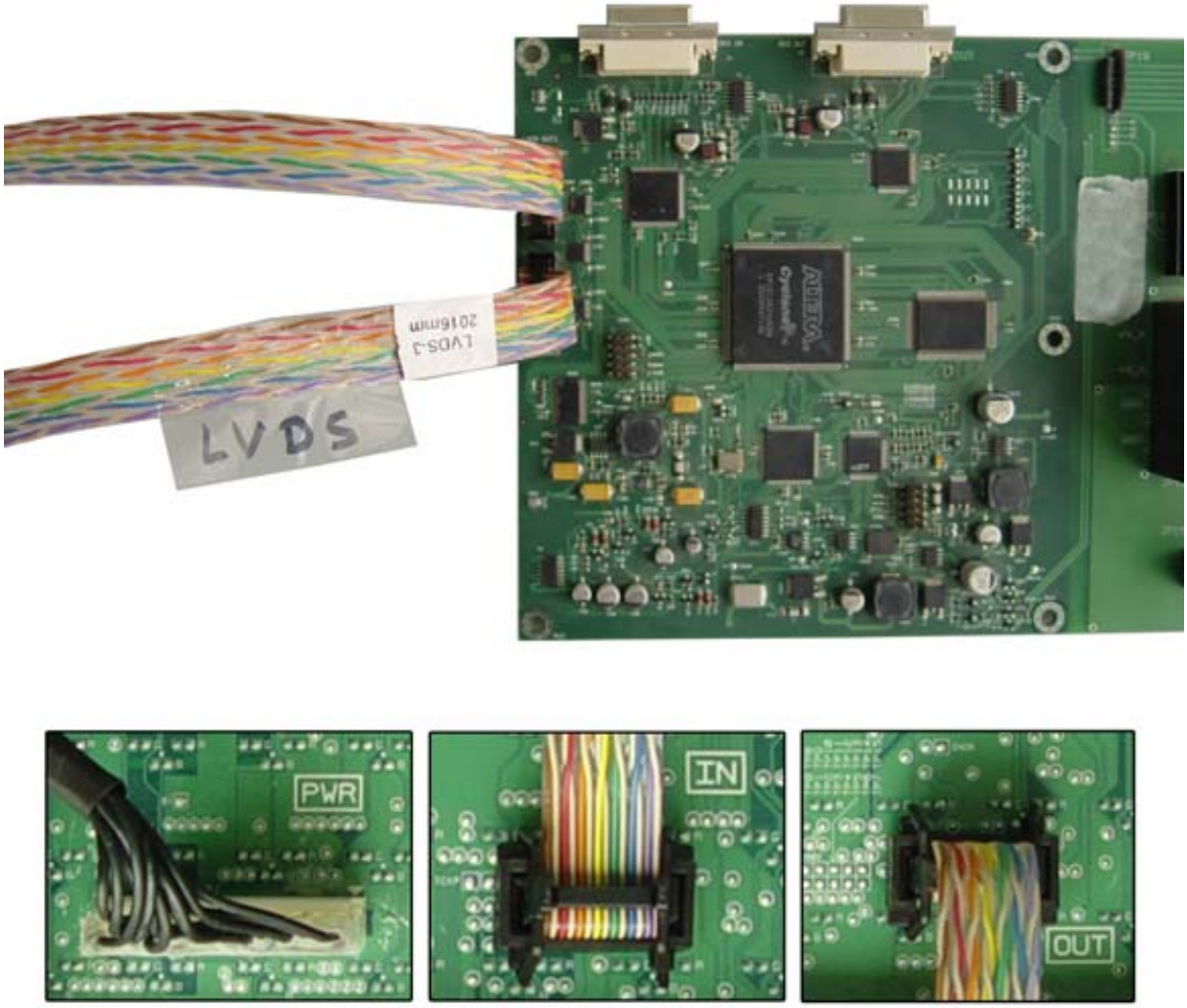


Image 5-3

WARNING: Do not forget to remove the adhesive tape afterwards.

5.4 Reconnecting cables

Introduction

Before reconnecting cables make sure that there is grease on the connector pins of the service component. When this is not the case, sent it back and order new one,or order specific grease using the following Barco article numbers:

Primer	DEOXIT-G5L32	**B1909246**
Grease	DEOXITL260-N35	**B1909247**

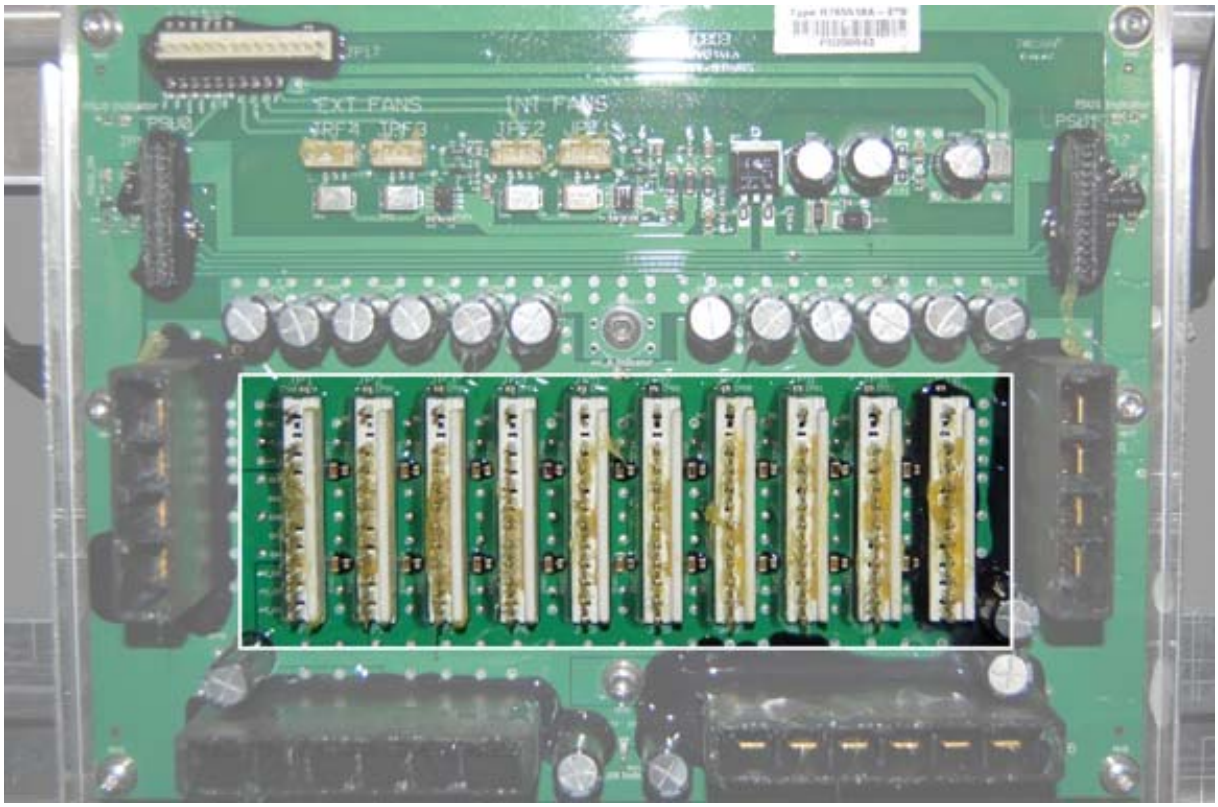


Image 5-4

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

WARNING: If the connector has insufficient grease, add more grease (B1909247).

Necessary tools

- Isopropanol alcohol.
- Grease primer (B1909246)
- Grease (B1909247)

How to apply grease?

1. Thoroughly clean the pins of the connector. It's recommend to use isopropanol alcohol as a solvent for cleaning the connector.
2. Wait 15 minutes.

3. Apply DEOXIT-G5L32 (**B1909246**) on the connector pins.
4. Wait 15 minutes.
5. Apply DEOXITL260-N35 (**B1909247**) on the connector pins.

6. TILE DISASSEMBLING

General information

Consult below table to locate a specific component inside each type of tile.

SP-20 tile

Service component	Position inside the tile
External fan + dust filter	Top of the left cabinet door
Internal fan	Bottom of the right cabinet door
PDB (Power Distribution Board)	Center of the left cabinet door
PSU (Power Supply Unit)	Center of the right cabinet door
Re-sync/controller unit	Bottom of the left cabinet door
Dust filters	Mounted inside the bottom of the tile

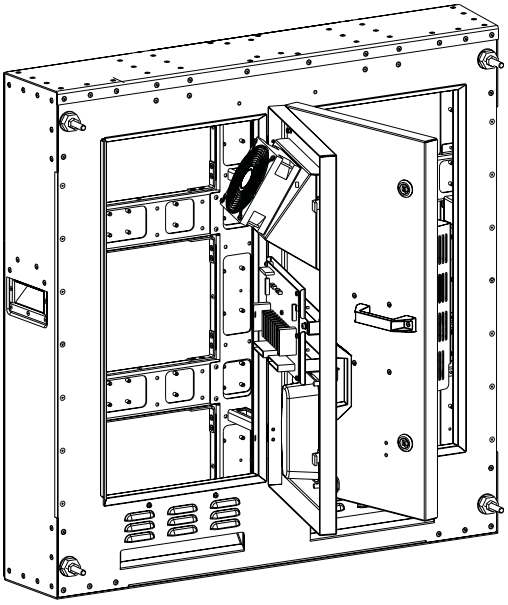


Image 6-1

Overview

- Disassembling an external fan + dust filter
- Disassembling an internal fan
- Disassembling a PDB (Power Distribution Board)
- Disassembling a Re-sync/controller unit
- Disassembling a LED-frame of a tile

6.1 Disassembling an external fan + dust filter

Before starting this process, consult the tables in the beginning of this chapter.

Necessary tools

Cross head screw driver.

External fan and dust filter

Note that the external fan is assembled together with a dust filter. When you remove the external fan, the dust filter will automatically come lose.

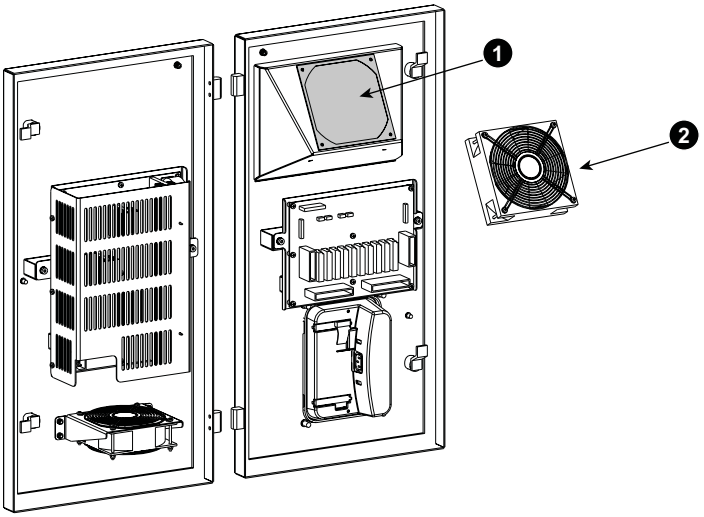


Image 6-2
1 Dust filter
2 External fan

WARNING: Replacing a malfunctioning external fan does not mean you need to replace the dust filter. Although it is strongly recommended to clean the dust filter before reassembling it. To clean a dust filter, use compressed air to blow out the gathered dirt.

How to take out an external fan and its dust filter?

1. Remove the four screws

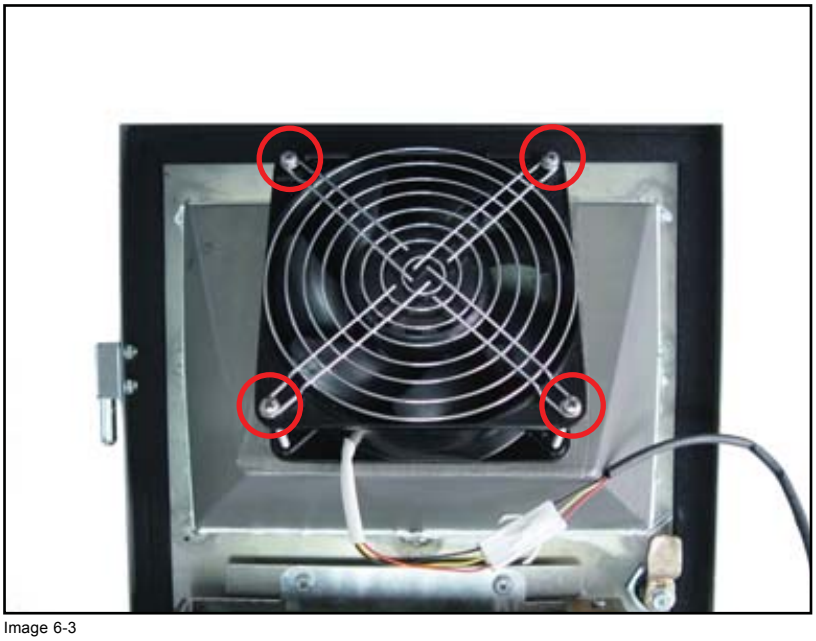


Image 6-3

2. Disconnect the power cable and take out the external fan and the dust filter

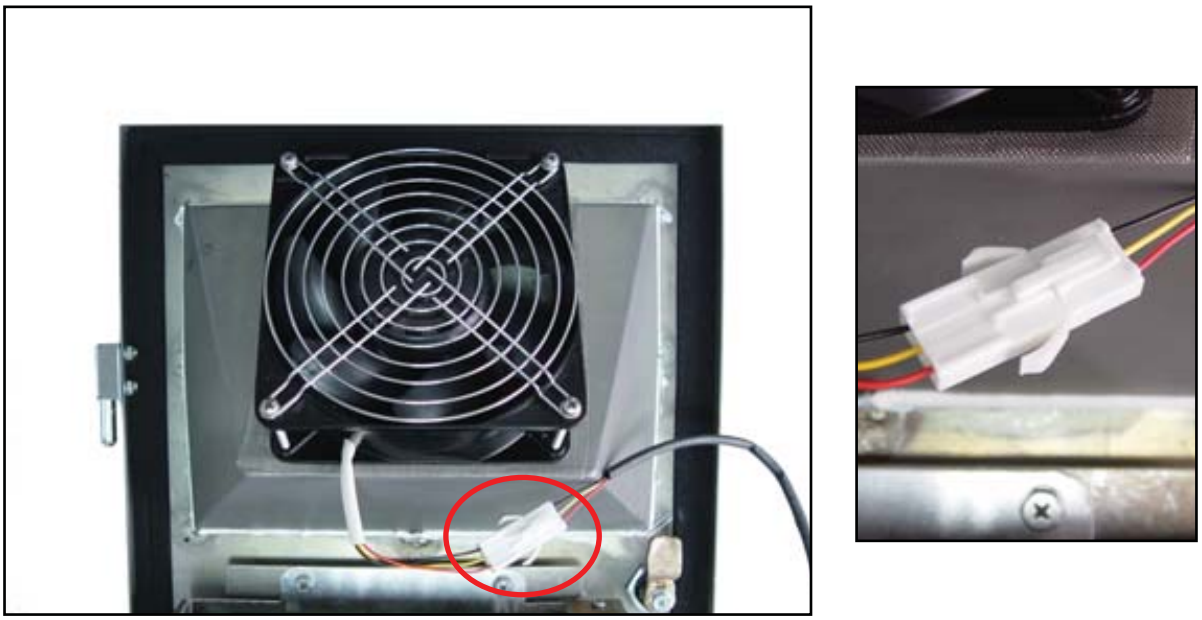


Image 6-4

6.2 Disassembling an internal fan

Necessary tools

8 mm open-end wrench.

How to take out an internal fan?

1. Disconnect the power cable.

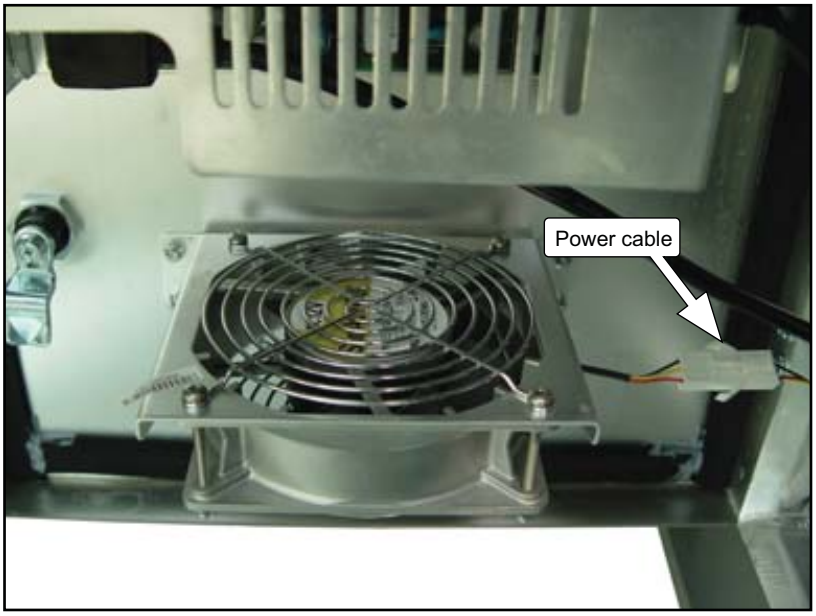


Image 6-5

2. Lose the four nuts located on the sides of the internal fan.

Image 6-6

3. Take out the internal fan.

6.3 Disassembling a PDB (Power Distribution Board)

Necessary tools

Cross head screw driver.

How to take out a PDB for a SP-20 tile?

1. Disconnect the indicated cables.

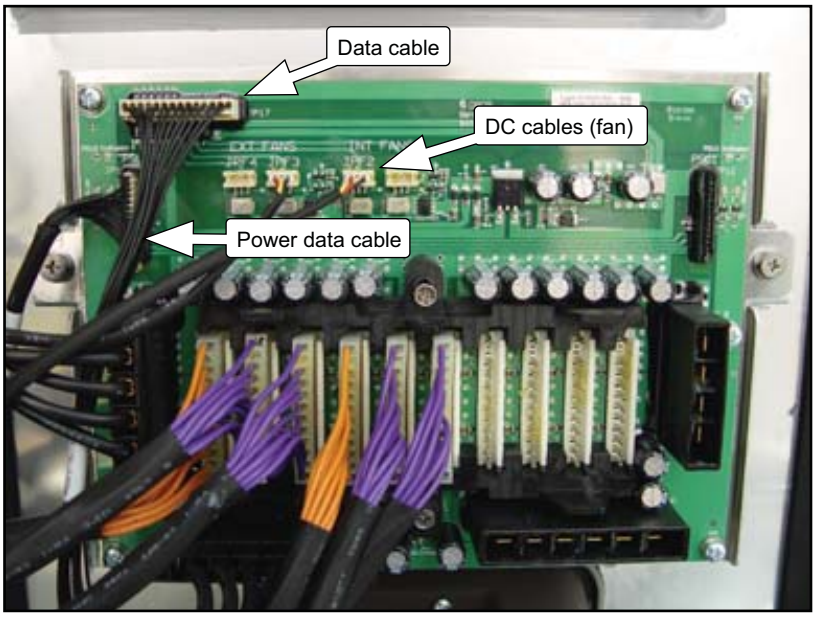


Image 6-7

2. Disconnect the 4–Pin and 6–Pin cable.

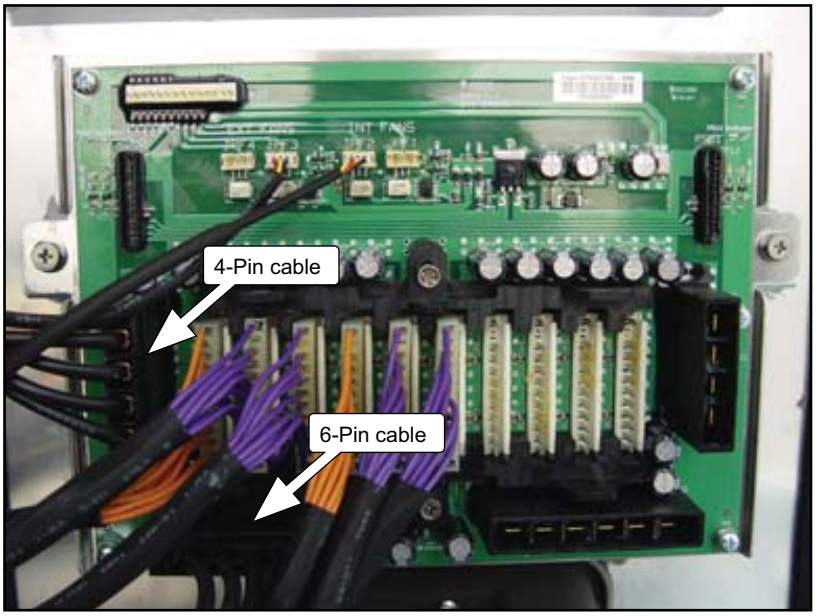
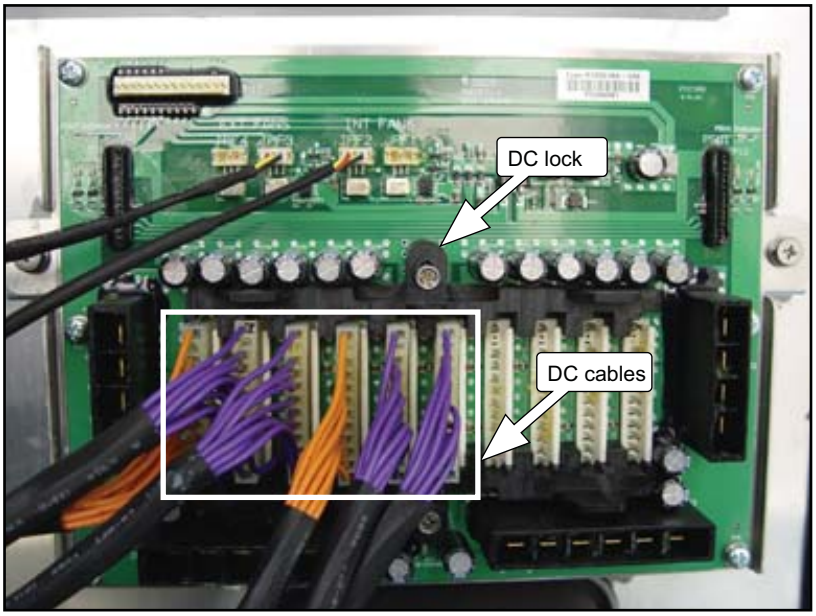


Image 6-8

3. Disconnect the 6 DC cables by unscrewing the DC lock.



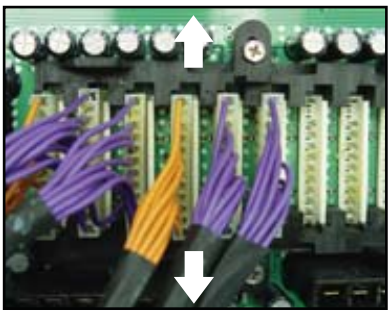


Image 6-9

4. Unscrew the 6 remaining screws.

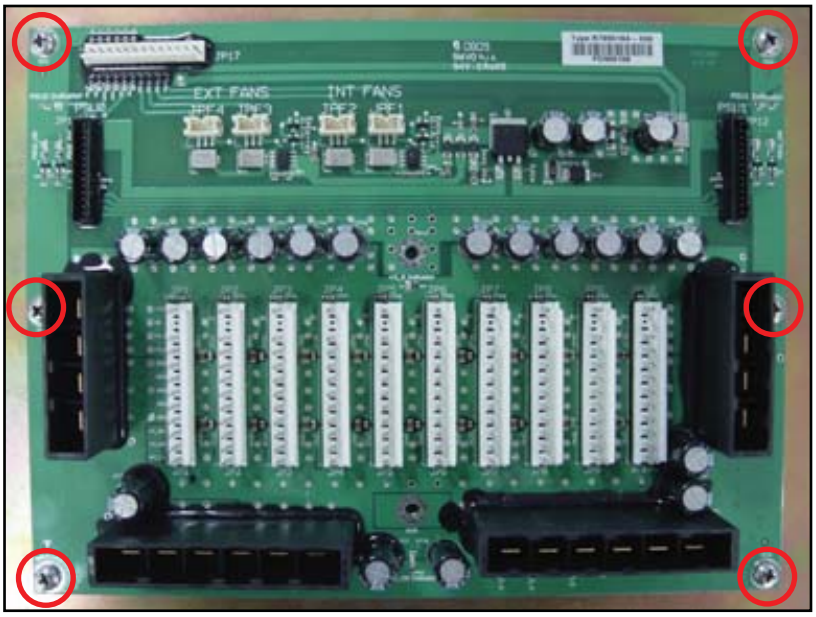


Image 6-10

6.4 Disassembling a Re-sync/controller unit

The SP-20 tile has a controller which is integrated on the re-sync unit. So, when replacing the re-sync unit of the SP-20 tile, the controller is replaced as well. Tile information stored in the memory of the SP-20 re-sync/controller unit is also stored in the memory blocks of the LED driver units. After replacement of the re-sync/controller unit the tile will automatically restore the tile information into the memory of the controller while initializing.

Necessary tools

- Cross head screw driver.
- Torx T10.

How to take out a Re-sync/controller unit

1. Lose the four screws from the back side of the tile.
   Note: *A Re-sync/controller unit always has to be taken out from the back side of the tile.*

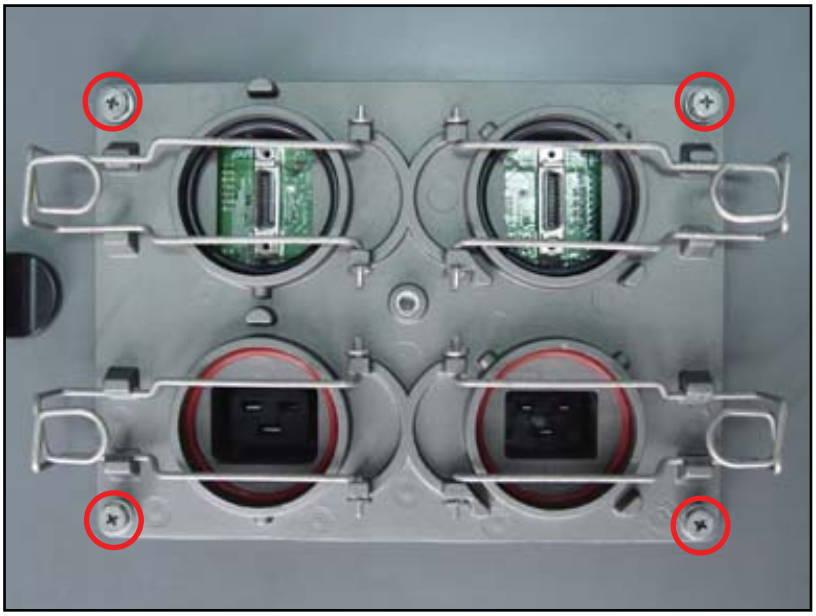


Image 6-11

2. Take out the Re-sync/controller unit and remove the indicated cables.

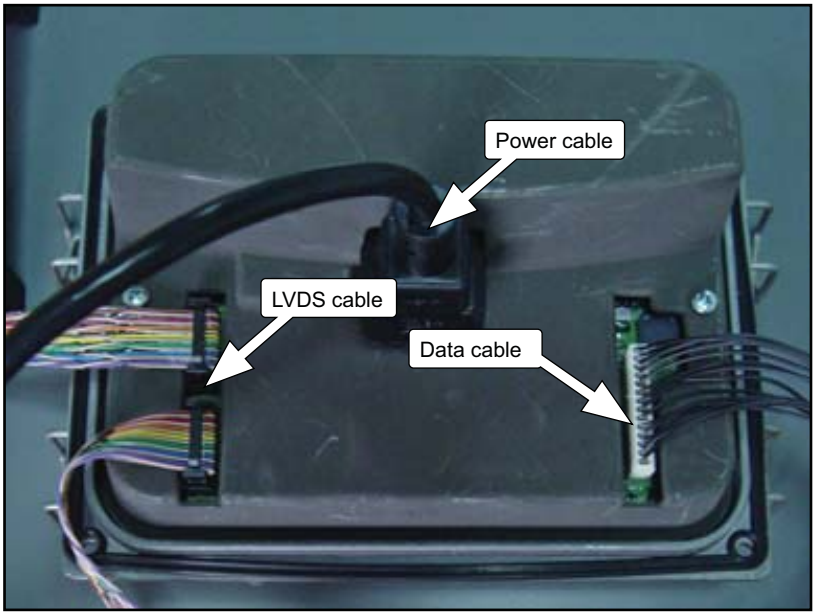


Image 6-12

WARNING: Do not lose the O-ring that is placed between the Re-sync/controller unit and the cabinet door. This O-ring has to be reused while replacing with a new Re-sync/controller unit.

Image 6-13

How to take out the controller from the Re-sync/controller unit?

1. Remove the indicated cables.

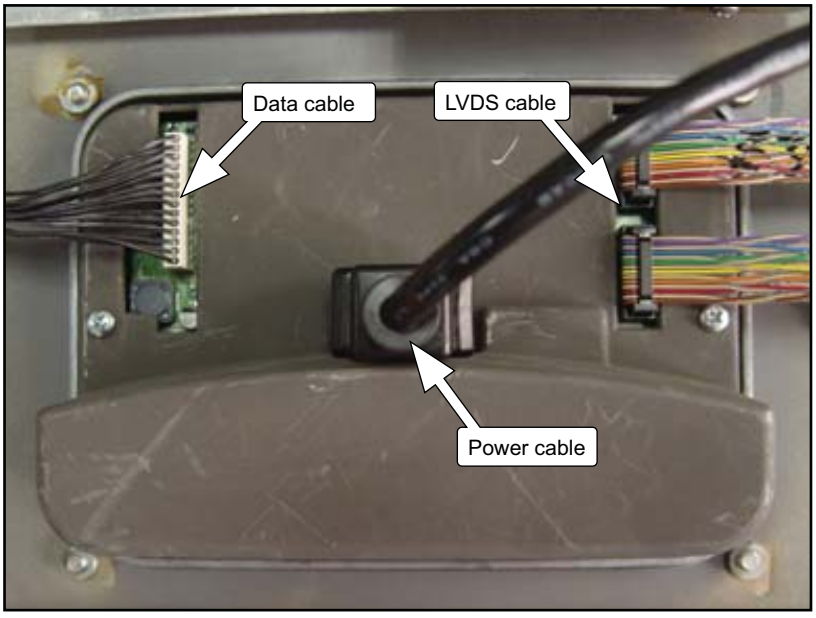


Image 6-14

2. Remove the cover by losing the two indicated screws.

Image 6-15

3. Take out the controller after removing the six indicated screws.

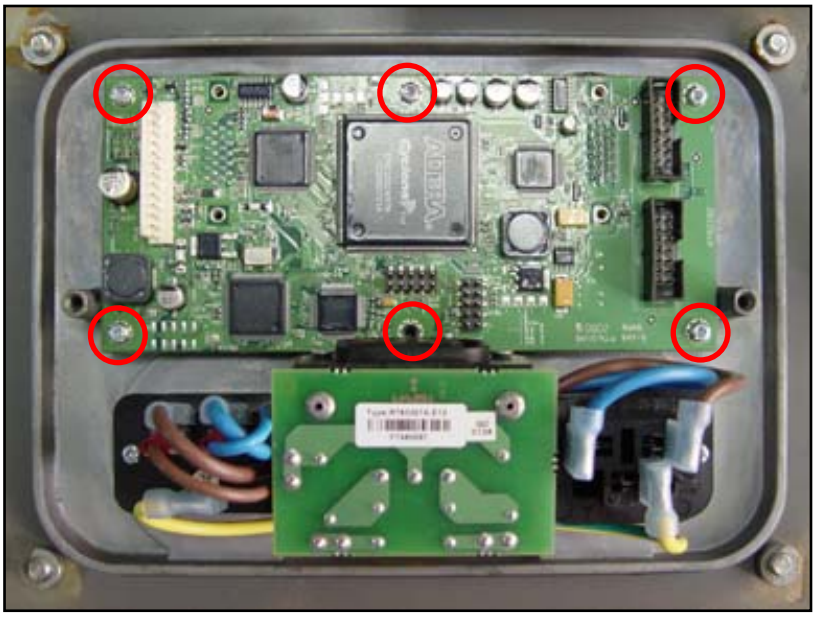


Image 6-16

6.5 Disassembling a LED-frame of a tile

Necessary tools

Torx T15.

How to take out a SP-20 LED-frame of a tile?

1. Unplug all power and data (LVDS) cables to the LED-frame. Remove the LVDS cables as illustrated.
   a) Flip down the clips at both sides of the cable fasteners.
   b) Remove the cable fasteners by pulling the clips open and finally remove the data cables.

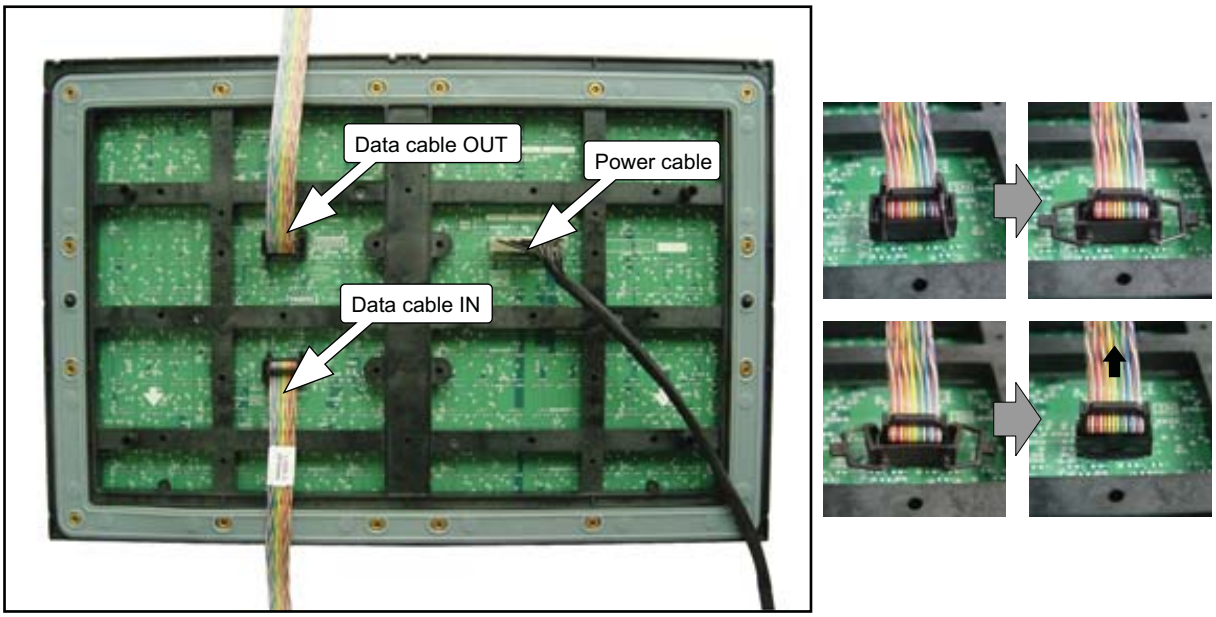


Image 6-17

2. Release the screws which attach the LED-frame with the tile housing.
   Note: *Some of the screws are located at the edges of the tile which makes them a little difficult to find.*

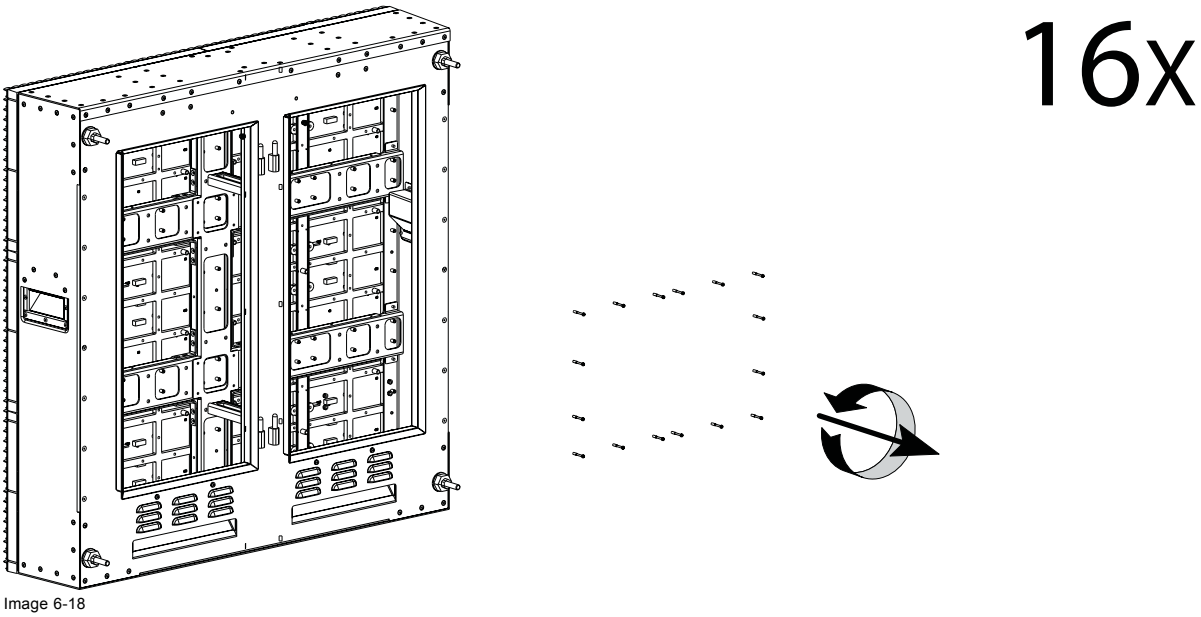


Image 6-18

3. Remove the LED-frame. Push it forward, rotate it and finally pull backwards and remove it from the SP-20 tile.

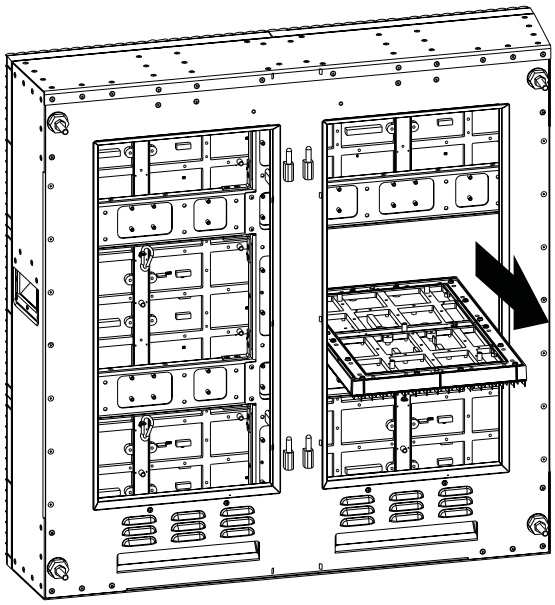


Image 6-19

7. TILE REASSEMBLING

Overview

- Reassembling an external fan + dust filter
- Reassembling an internal fan
- Reassembling a PDB (Power Distribution Board)
- Reassembling a PSU (Power Supply Unit)
- Reassembling a Re-sync/controller unit
- Reassembling a LED-frame of a SP-20 tile

7.1 Reassembling an external fan + dust filter

Necessary tools

Cross head screw driver.

External fan and dust filter

A dust filter is located underneath the external fan. Always check the status of the dust filter before replacing the external fan.

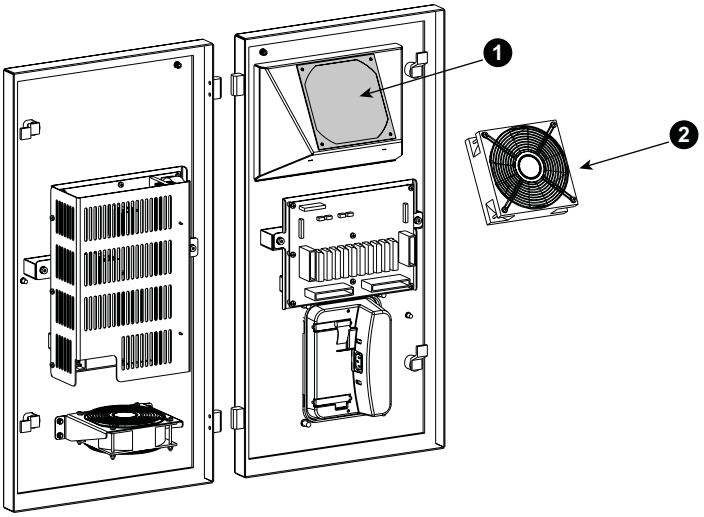


Image 7-1

WARNING: Replacing a malfunctioning external fan does not mean you need to replace the dust filter. Although it is strongly recommended to clean the dust filter before reassembling it. To clean a dust filter, use compressed air to blow out the gathered dirt.

How to insert a dust filter and an external fan?

1. Place the dust filter underneath the external fan and position both components in place.
2. Connect the power cable.

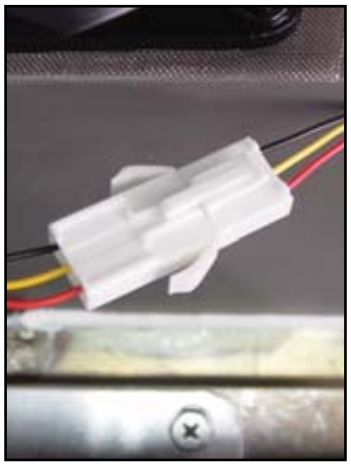


Image 7-2

3. Fasten the four indicated screws.

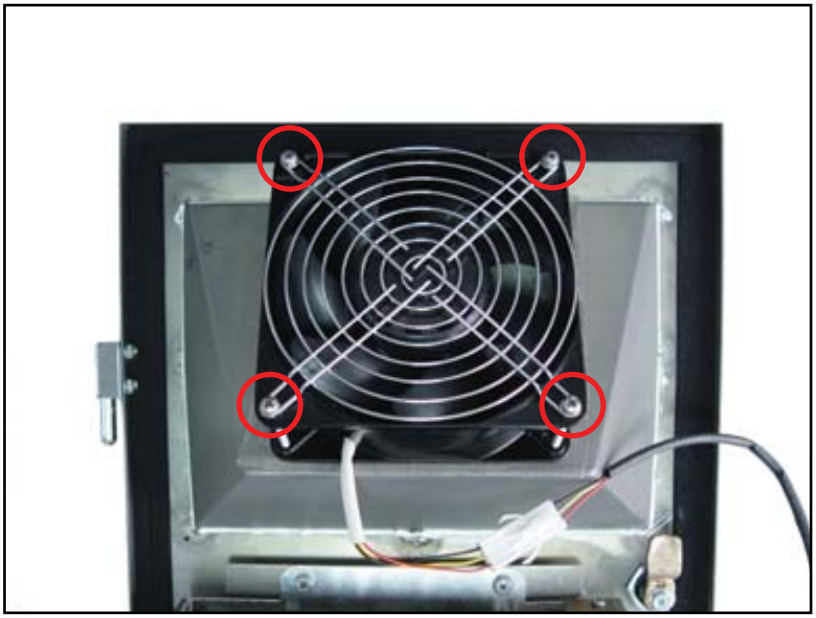


Image 7-3

7.2 Reassembling an internal fan

Necessary tools

8 mm open-end wrench.

How to insert an internal fan?

1. Position the internal fan.
2. Fasten the four nuts at the sides of the internal fan.

Image 7-4

3. Connect the power cable.

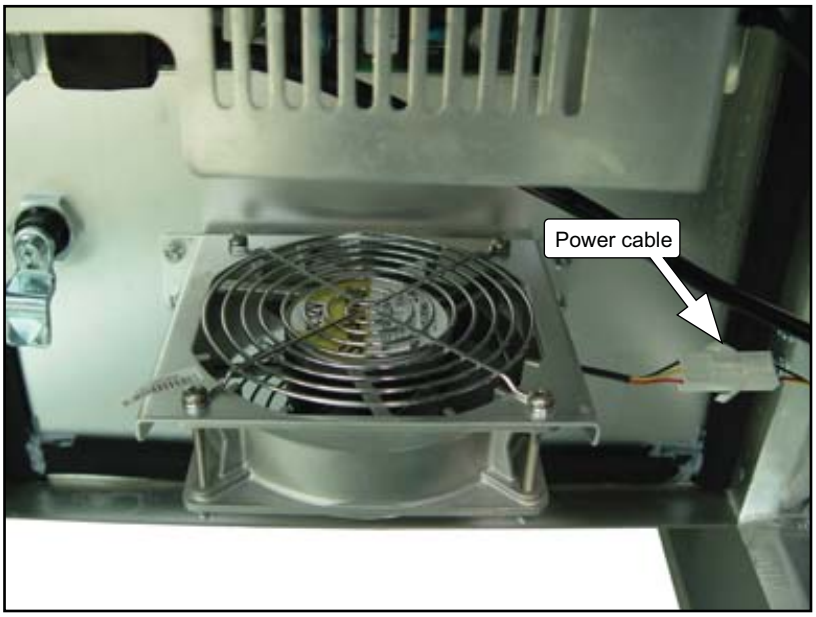


Image 7-5

7.3 Reassembling a PDB (Power Distribution Board)

The PDB is located in the center of the left cabinet door.

Necessary tools

Cross head screw driver.

How to insert a PDB on a SP-20 tile?

1. Position the PDB and fasten the 6 screws.

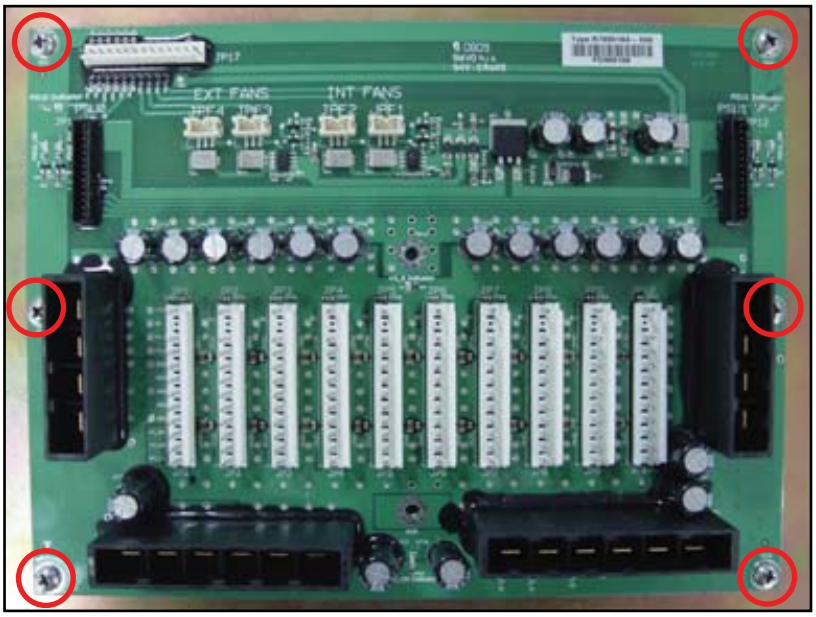
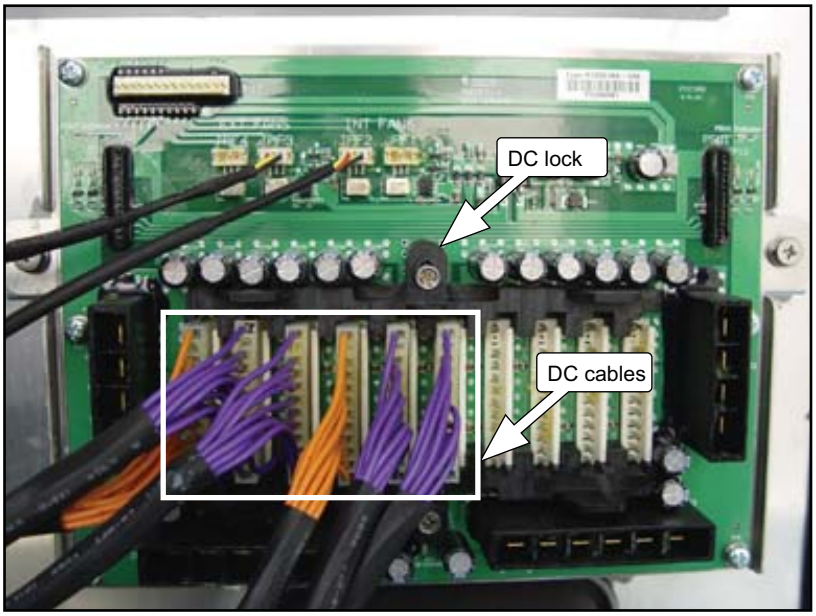


Image 7-6

2. Connect the 6 DC cables by fixing the DC lock.



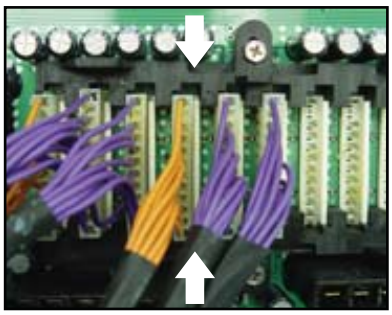


Image 7-7

3. Connect the 4–Pin and 6–Pin cable.

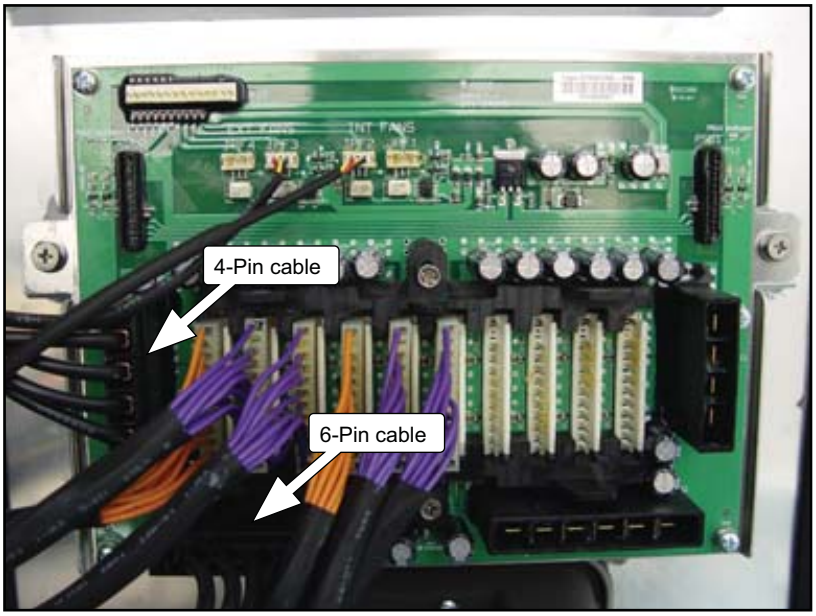


Image 7-8

4. Connect the indicated cables.

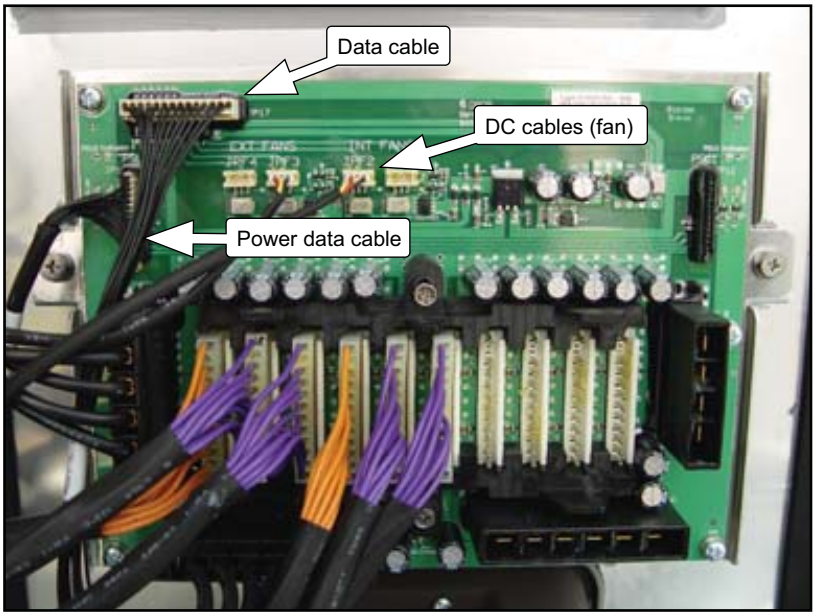


Image 7-9

7.4 Reassembling a PSU (Power Supply Unit)

Necessary tools

Cross head screw driver.

How to insert the PSU?

1. Slide the PSU back into its position.

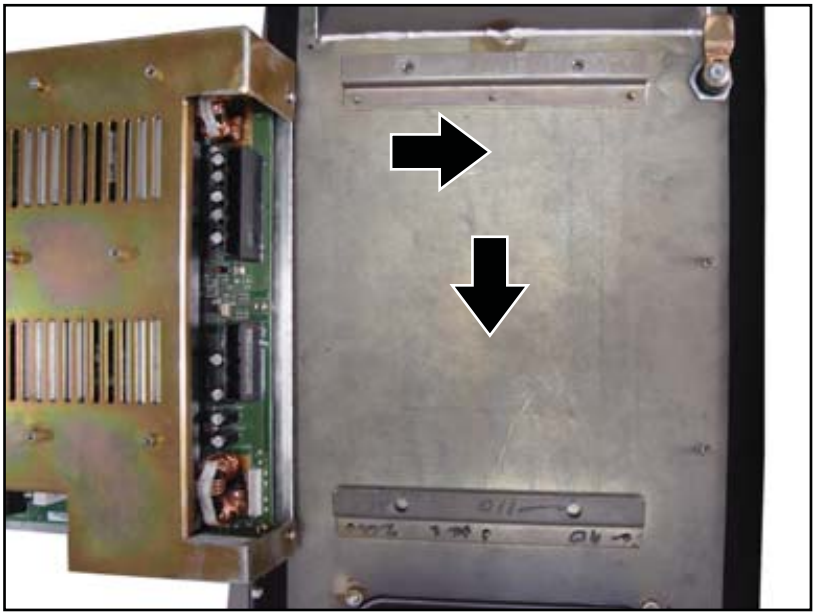


Image 7-10

2. Fasten the two screws on top of the PSU.

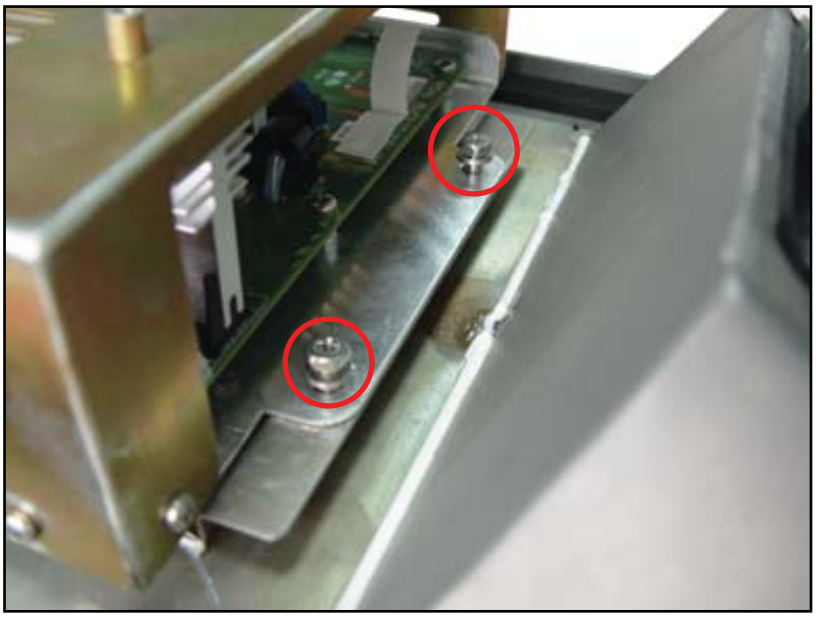


Image 7-11

3. Connect the DC cable, 4–Pin cable, the 6–Pin cable and the power data cable as illustrated.

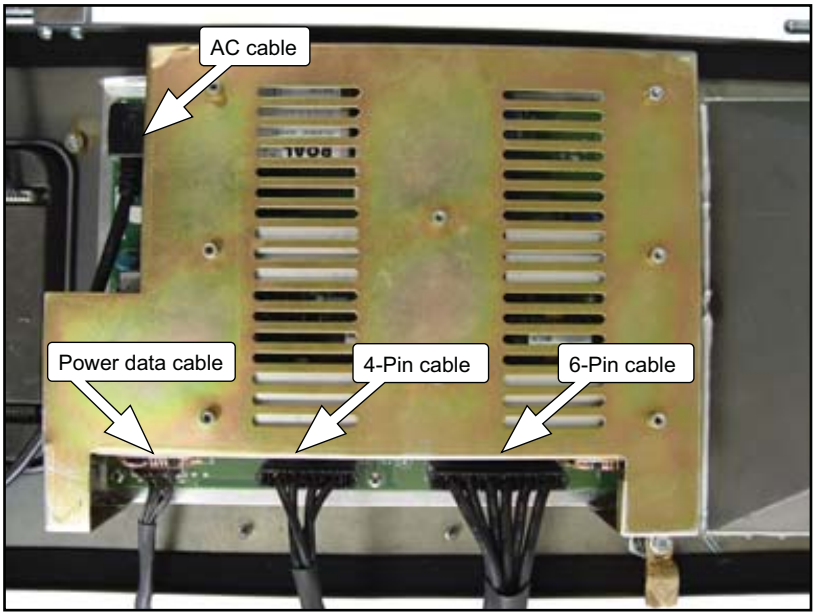


Image 7-12

7.5 Reassembling a Re-sync/controller unit

The SP-20 tile has a controller which is integrated on the re-sync unit. So, when replacing the re-sync unit of the SP-20 tile, the controller is replaced as well. Tile information stored in the memory of theSP-20 re-sync/controller unit is also stored in the memory blocks of the LED driver units. After replacement of the re-sync/controller unit the tile will automatically restore the tile information into the memory of the controller while initializing.

Necessary tools

- Cross head screw driver.
- Torx T10.

How to insert a Re-sync/controller unit?

1. Before reconnecting the cables, first position the O-ring on the Re-sync/controller unit.

Image 7-13

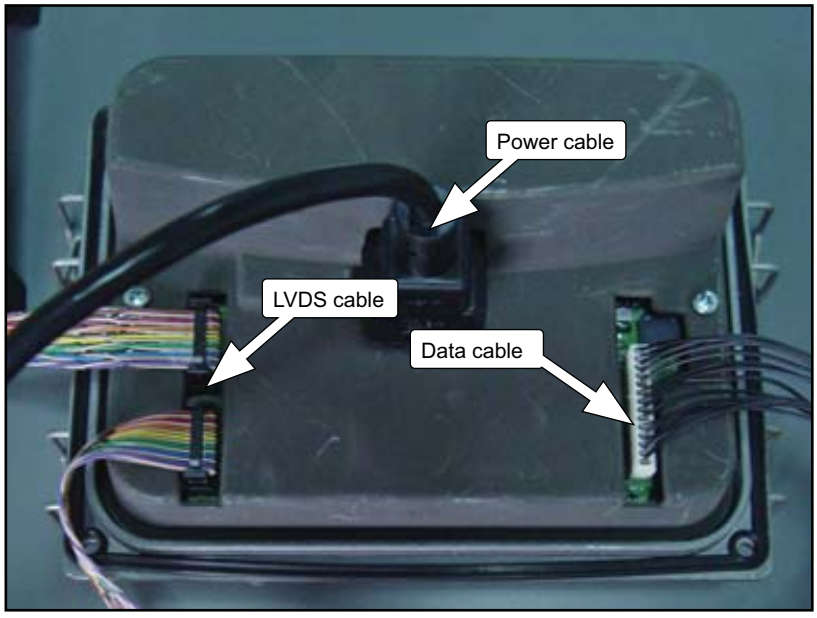


Image 7-14

2. Put the Re-sync/controller unit back in its position and fasten the four screws.

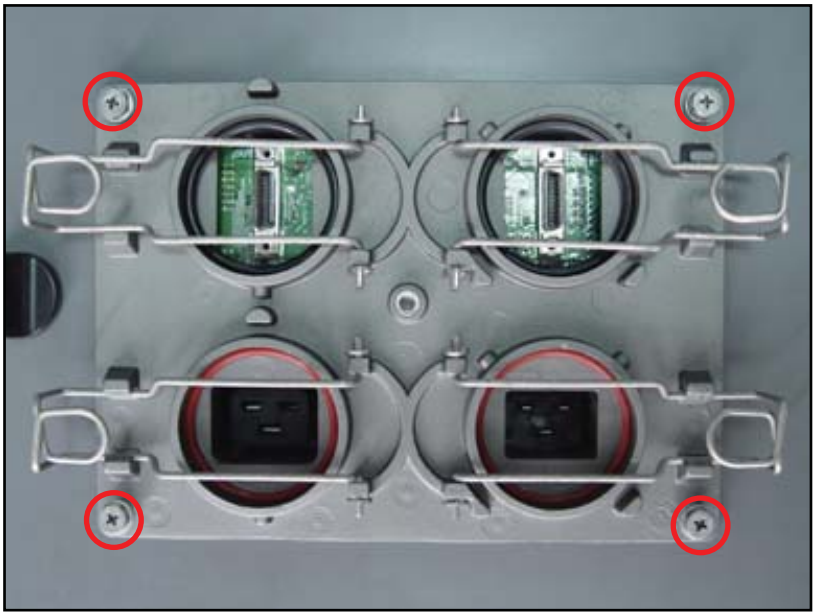


Image 7-15

How to insert the controller in the Re-sync/controller unit?

1. Position the controller and fasten the indicated screws.

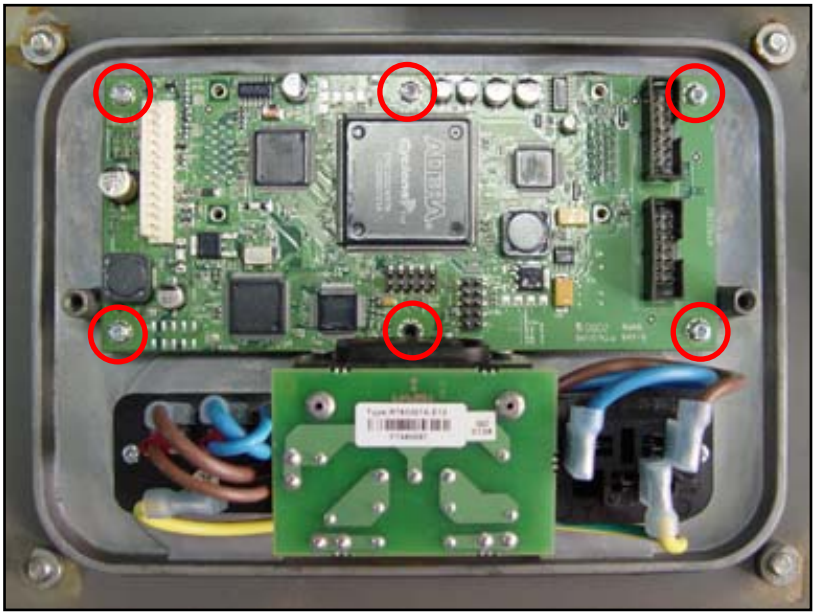


Image 7-16

2. Insert the cover by fastening the two indicated screws.

Image 7-17

3. Connect the cables as illustrated.

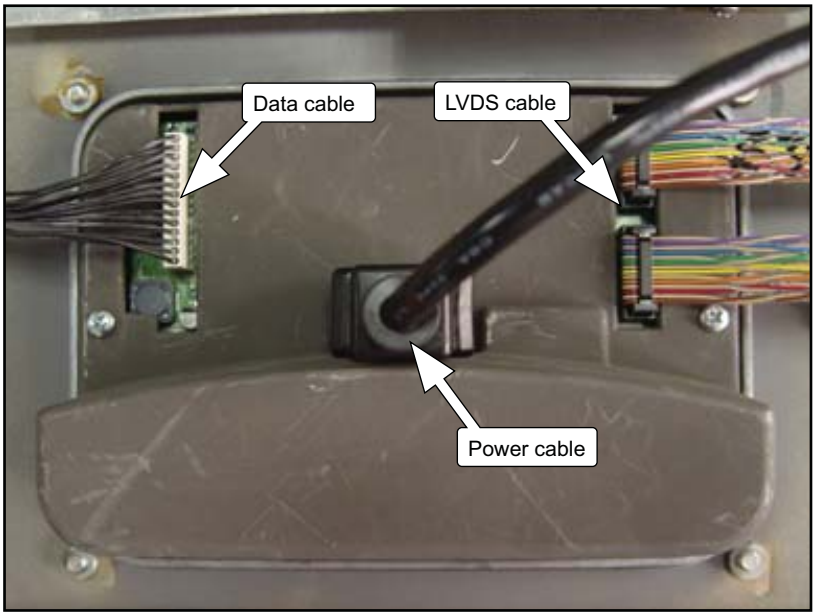


Image 7-18

7.6 Reassembling a LED-frame of a SP-20 tile

Necessary tools

Torx T15.

How to insert a LED-frame of a SP-20 tile?

1. Push frame through the tile opening, turn it and pull it back into its position in the SP-20 tile.

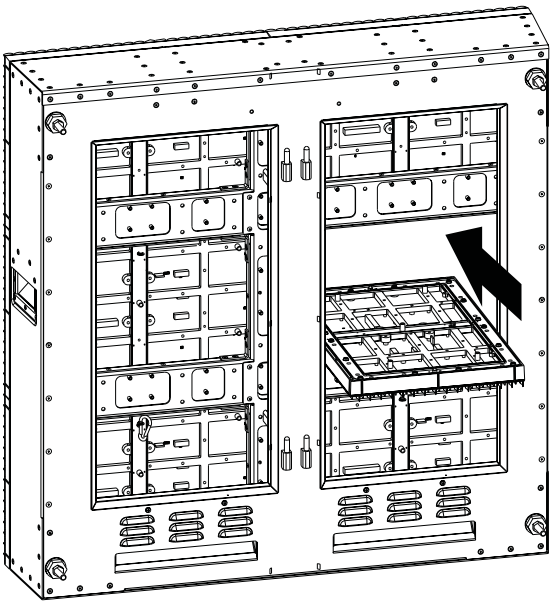


Image 7-19

2. Fasten the screws which attach the LED-frame with the tile housing.
   Warning: *Some of the screws are located at the tile outside.*

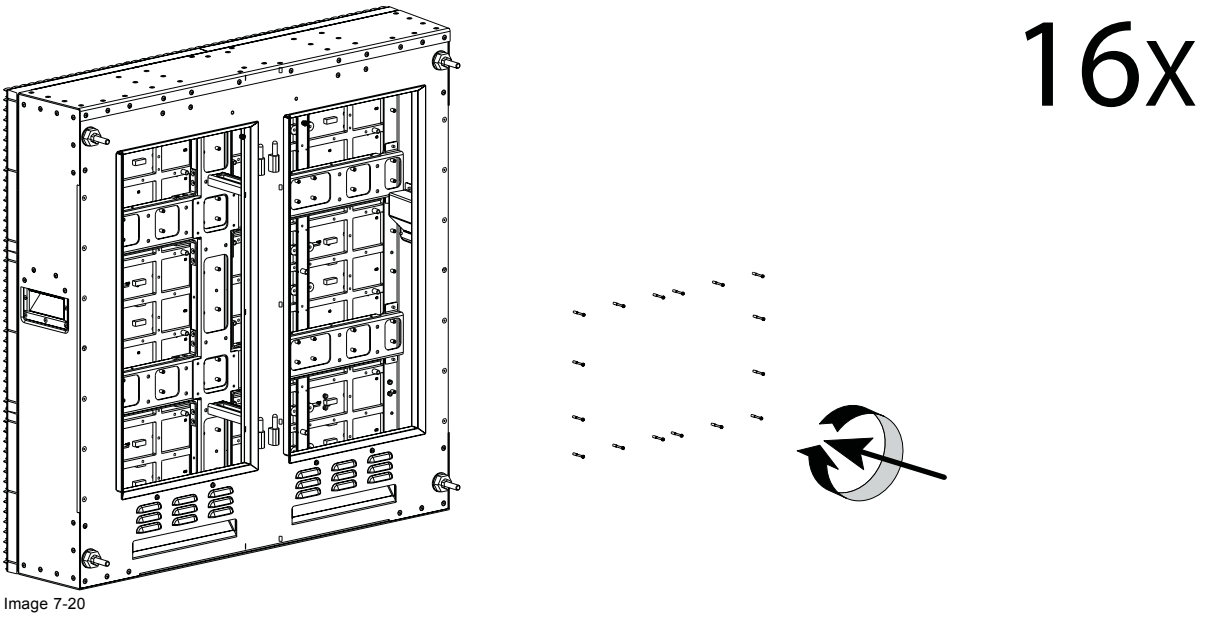


Image 7-20

8. MAINTENANCE

About this chapter

This chapter contains maintenance information about the SP-20 tiles like cleaning, shader replacement and color calibration.

Overview

- Cleaning SP-20 tiles
- Replacing the dust filters
- Replacing a shader of a SP-20 LED-frame
- Color calibration

8.1 Cleaning SP-20 tiles

Why clean SP-20 tiles?

Due to outdoor use the SP-20 tile is exposed to all kinds of weather conditions. Sand, dust, smog and other dirt adhere on the SP-20 tile and therefore the visual performance of the SP-20 display is reduced. That's why cleaning the SP-20 tiles is recommended at regular intervals.

Image 8-1
Cleaning LED's and shaders

Always clean all tiles of the LED-wall to avoid brightness differences between cleaned and uncleaned tiles.

Necessary tools

- Vaporizer with a window cleaning product.
- Soft hand brush with long hair (recommended 4 cm pure pork hair).
- Garden hose with a spray nozzle.
- Compressed air.

How to clean SP-20 tile ?

1. Seal up the data and power sockets using a power and data linking cable. Make sure that all plug holder clamps are locked firmly.
2. Place the tile flat on a solid table with the LED's facing upwards and vaporize, through different directions, the window cleaning product on the shaders and LED's.
   Caution: *Do not use industrial grease removers. Use only materials or chemicals that are inert, nonabrasive, noncorrosive and non-marking.*
3. Brush down all dirt of the LED's and the shaders using a soft hand brush.
   Caution: *Do not use a hard bristled brush.*
4. Spray the cold water onto the shader surface according to the following specifications:
   - **Nozzle**: 6.3 mm
   - **Minimum distance:** 3 m
   - **Maximum pressure:** 25 kPa
   - **Maximum flow rate:** 10 l/min

   Caution: *Do not submerge the tile fully or partly in water or other liquids.*
5. Equally spray water over the whole surface of the SP-20 display.
   Warning: *Do not constantly spray on the same spot of the SP-20 display.Use big movements to go over the same spot several times.*
6. Repeat from step two until the tile is clean.
7. Blow the surface dry with compressed air.

The SP-20 tile can also be cleaned while they are mounted. A solid scaffold or Z-lift is required to do so. Start cleaning from top row to bottom row using the above procedure.

8.2 Replacing the dust filters

High density dust filters

SP-20 tile is equipped with two high density dust filter. The dust filters are located at the inner side of the tile. Barco offers a spare kit with dust filters.

CAUTION: The high density dust filters of the SP-20 tile must be replaced on a regular basis, depending on the environment conditions of the SP-20 display.

How to replace the dust filters of the SP-20 tiles?

1. Consult to locate the dust filters inside the SP-20 tile.

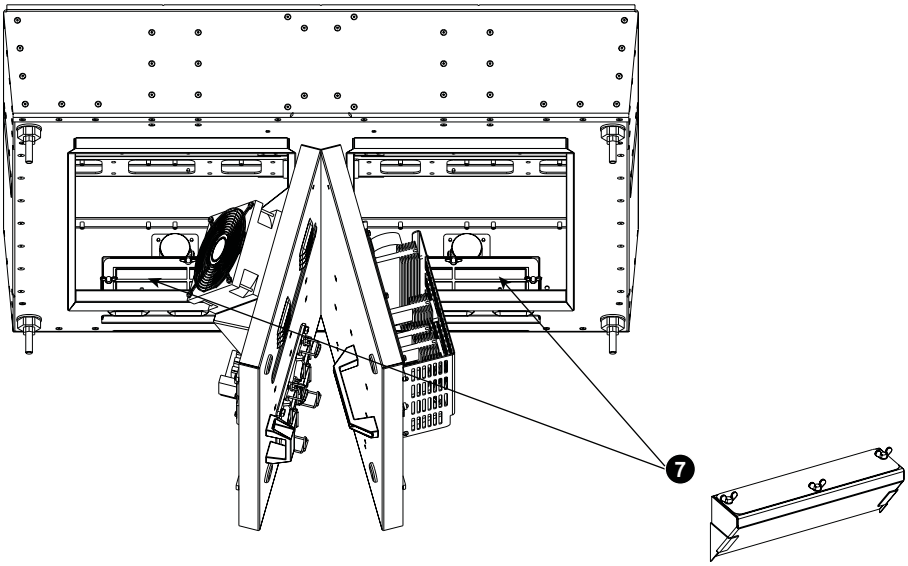


Image 8-2
7 duster filter

2. Open the cabinet door(s)

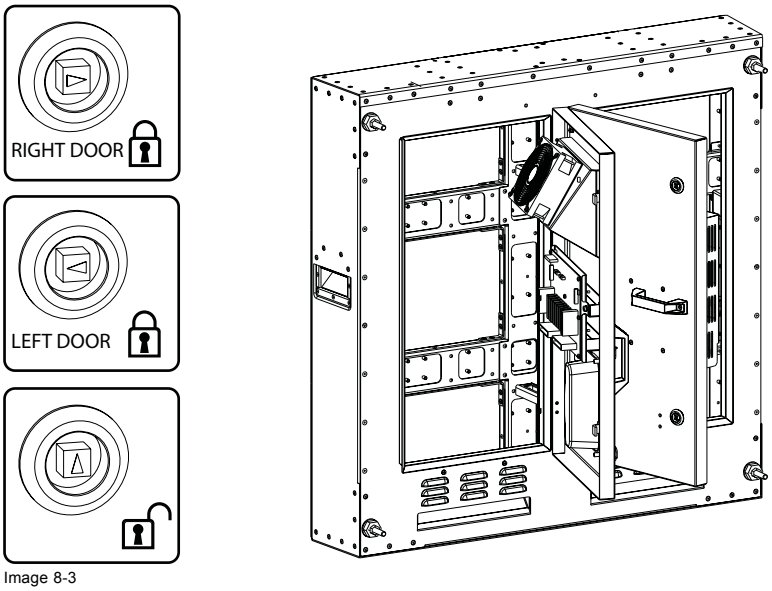


Image 8-3

3. Remove the dust filter (2) by releasing the wing screws (1) as illustrated.

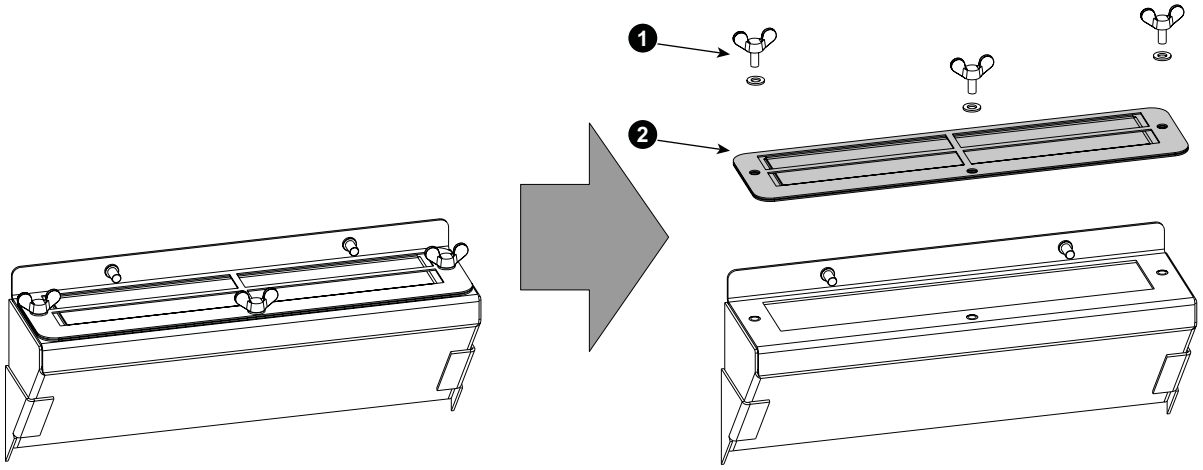


Image 8-4

4. Place a new dust filter (2) in the dust filter socket.
5. Fasten the wing screws (1).
6. Close and lock the cabinet door(s).

8.3 Replacing a shader of a SP-20 LED-frame

EMC plate

When replacing a shader pay attention to the EMC plate. Make sure the EMC plate doesn't suffer damage through the process and it is placed correctly inside the frame before fixing the new shader(s).

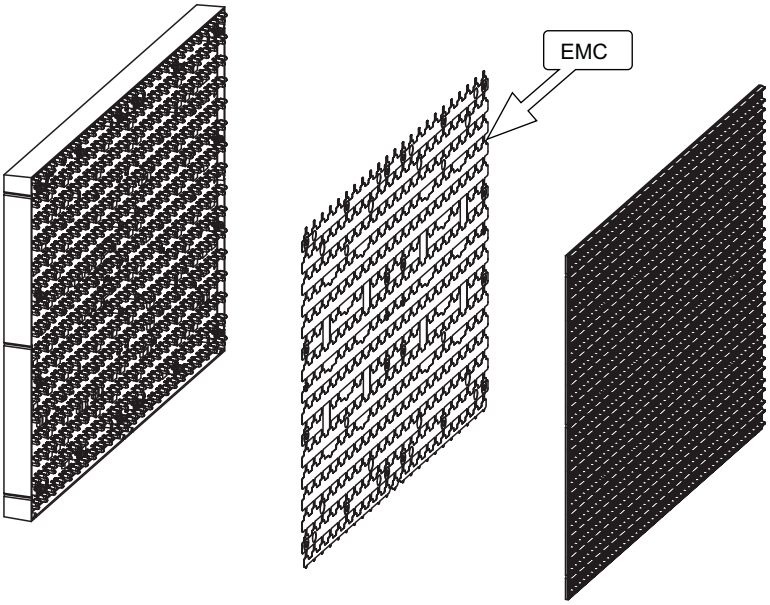


Image 8-5

Necessary tools

- Small Phillips screw driver.
- Torx T15.
- Small flat screwdriver.

How to replace a SP-20 shader?

1. Unscrew the eight small center screws.

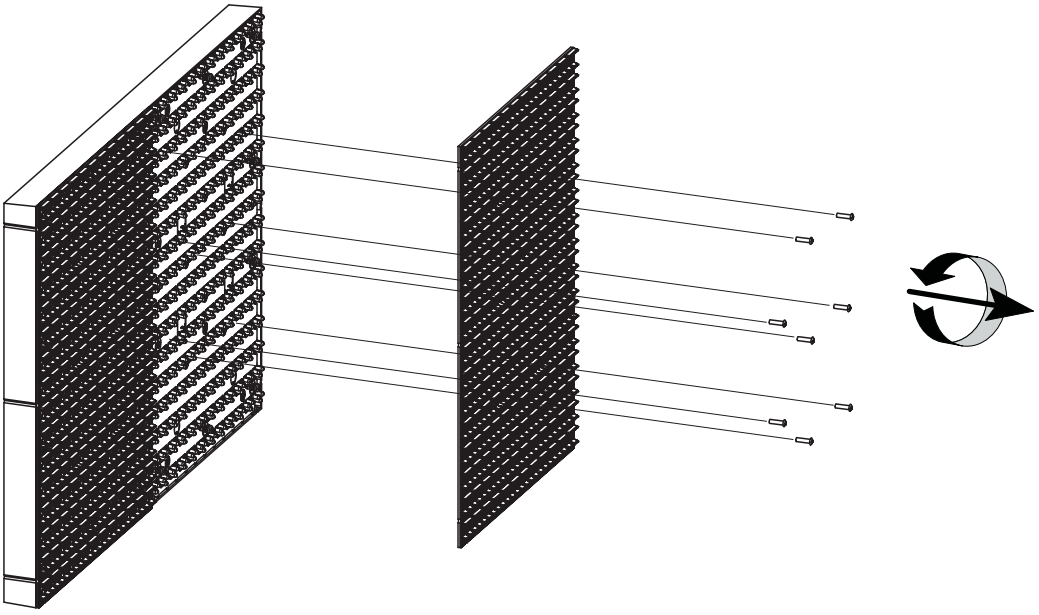


Image 8-6

2. Unscrew the eight screws around the edges of the shader using the illustrated method.

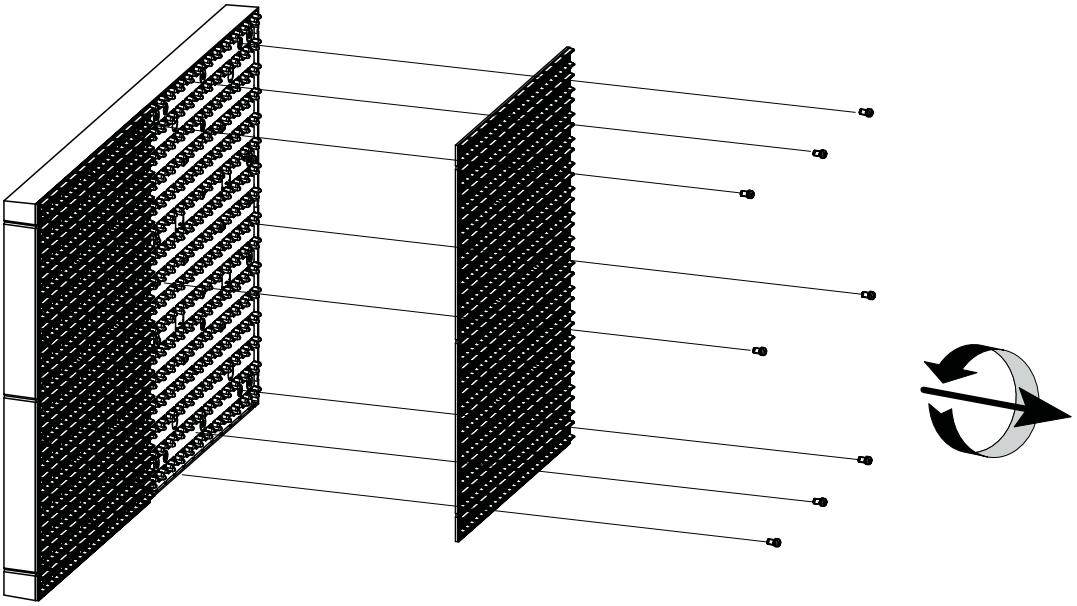


Image 8-7

3. Position the new shader and screw it on.

Warning: *When the screws or their belonging O-rings have any visible sign of damage, replace them with new ones. Spare parts can be found in the following spare kit:* ***B352804K****. When assembling, first push the O-rings down using a flat screwdriver until they touch the surface of the shader. Afterwards, fix the screws using a T15 Torx head screwdriver.*

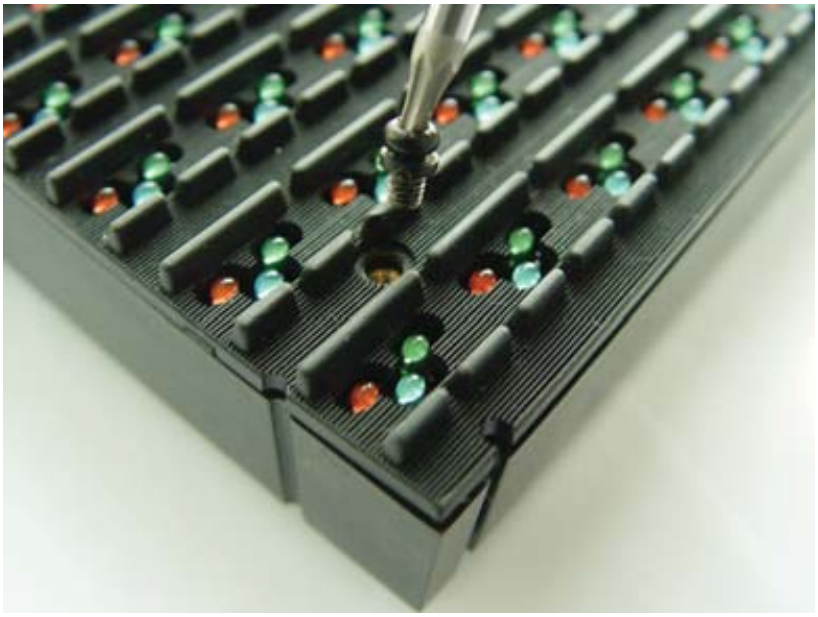


Image 8-8

8.4 Color calibration

Color calibration of a SP-20 display

To achieve color uniformity among all tiles of the same display, the tiles have to be color calibrated. This is done in factory but due to service intervention like replacing LED-frames,SP-20 controllers or even complete tiles, it's recommended to re-calibrate the SP-20 display on site. Refer to the user guide of the control software for more info about color calibration and calibration instructions.

Director Toolset
Configuration and control of a wide range of displays
Loading device plugins (dataobjects) ... done
Copyright © 2007, Barco
BARCO

Image 8-9
Director toolset manual: **R9850045**

Image 8-10
RMS manual: **R59770142**

9. DIMENSIONS

Overview

- Dimensions of the SP-20 tile

9.1 Dimensions of the SP-20 tile

Dimensions of the tile

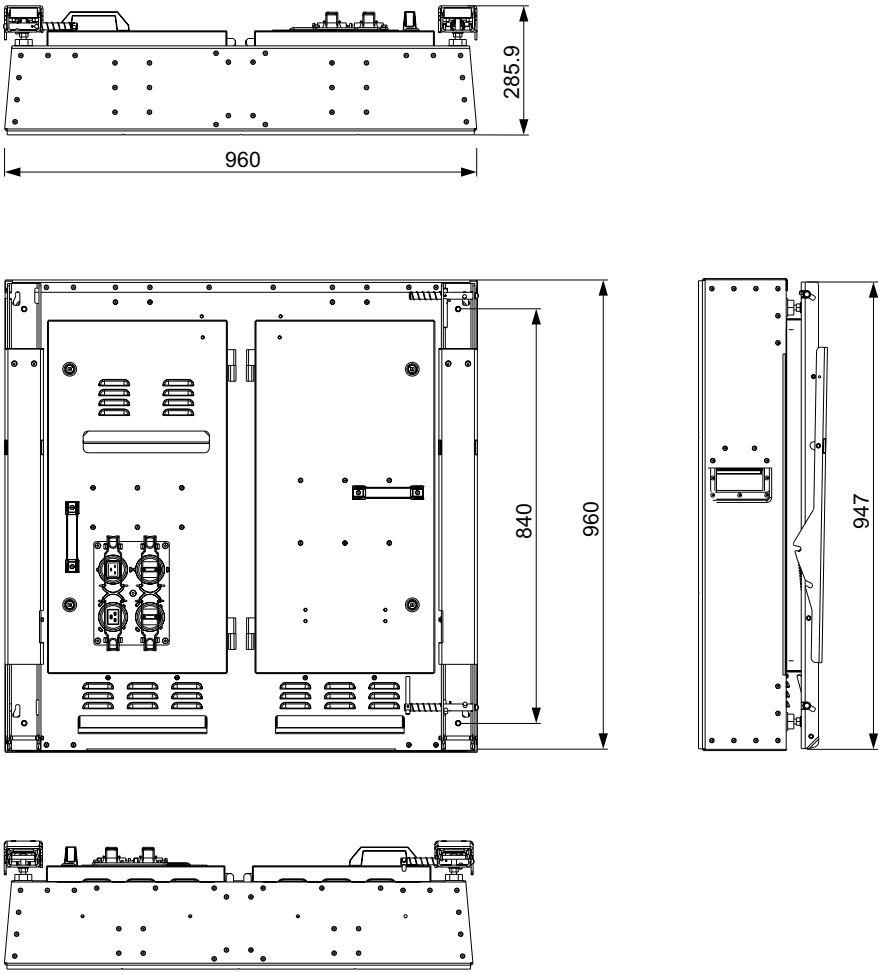


Image 9-1

Dimensions of the foot system

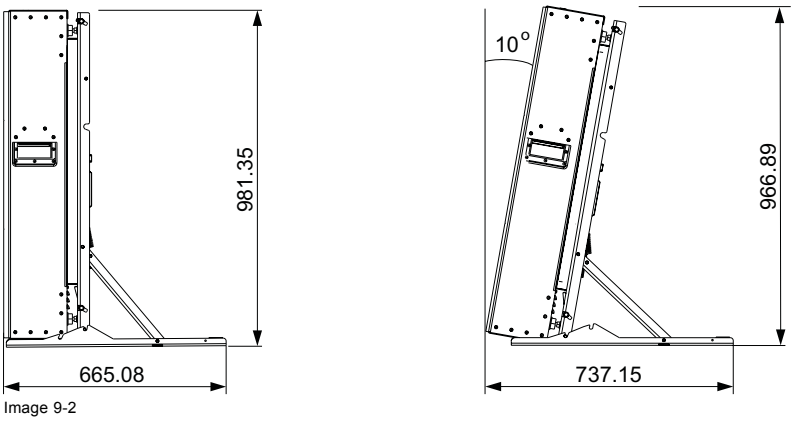


Image 9-2

10. ON SCREEN DISPLAY MESSAGES

General

A SP-20 display can generate and display several “On Screen Display” (OSD) messages regarding parameter statuses of the display. Most of those messages can be displayed on request via the RMS-1 software. Other OSD messages are automatically displayed in case an error occurred. Most OSD messages are displayed for a time period of 10 seconds or continuous, depending the software settings.

Overview

- OSD messages

10.1 OSD messages

List with OSD messages for the SP-20 display

OSD message	Description
ACONT 100 100 100	Displaying the RGB values set for analog contrast. These values are factory pre-adjusted.
ADDR 3	Displaying address.
ADDR 26	Displaying tile address. Note that all devices in the data chain has an address number, starting with the master digitizer having address “1”. The address number increments for all following devices in the data chain. Each digitizer, fiberlink transmitter, fiberlink receiver, AEC and all tiles in the data chain are considered as a device with a unique address.
CALI LEVEL1 ONLYW CORR LMA&COR	Displaying calibration-status (calibration method : only white, luma + correction).
CALI LEVEL1 RGB&W CORR LMA&COR	Displaying calibration-status (calibration method : RGB + white, luma + correction).
CALI LEVEL1 ONLYW CORR NOCORR	Displaying calibration-status (calibration method : only white, no correction on screen).
CALI LEVEL1 NOTYET CORR LMA&CORR	Displaying calibration-status (calibration method : calibration not done yet).
CTRL- CPLD 00.02	Displaying controller — CPLD version.
FANSPED 50 r/s 51 r/d 45 r/s	Displaying fan speed.
FANSTAT OK OK OK	Displaying fan status.
FANSTAT OK FAIL POWEROFF	Displaying fan status (1 OK, 1 Fail, 1 Power off)

OSD message	Description
FANSTAT CHECKING CHECKING CHECKING	Displaying fat status (fan status not ready)
FIRM A1.04 B1.02 C1.20	Displaying firmware version of the re-sync unit (second line), firmware version controller (third line) and the firmware version of the driver (fourth line).
FPGA 0.03 ID: TR-20	Displaying FPGA firmware versions.
FRAME CNT0 1234 5678	Display frame-counter in MODULE 0.
FRAME CNT1 1234 5678	Display frame-counter in MODULE 1.
FRAME CNT2 1234 5678	Display frame-counter in MODULE 2.
FRAME CNT3 1234 5678	Display frame-counter in MODULE 3
FRAME CNT4 1234 5678	Display frame-counter in MODULE 4.
FRAME CNT5 1234 5678	Display frame-counter in MODULE 5.
FRAME CNT6 1234 5678	Display frame-counter in MODULE 6.
FRAME CNT8 1234 5678	Display frame-counter in MODULE 8.

OSD message	Description
FRAME CNT9 1234 5678	Display frame-counter in MODULE 9.
HPOS I2C- ERROR	Error occurs when reading horizontal window.
HPOS 36 - 73	Displaying horizontal window.
HPOS 144 → 216	Displaying the start pixel row and end pixel row of the tile in the complete LED-wall. The origin is always left top of the display.
MEAS SYST ALL 156	Displaying measurement system.
RS232 SPEED 19200 baud	Displaying the current RS232 speed which value is set to 19200 baud.
PSU0: OK PSU1: OK	Displaying PSU status (both OK).
PSU0: OK PSU1: FAIL	Displaying PSU status (1 OK, 1 fail).
PSU0: OK PSU1: UNSTABL	Displaying PSU status (1 OK, 1 unstable).
PSU0: OK PSU1: RECOVER	Displaying PSU status (1 OK, 1 recover from unstable).
RUN- TIME 100 H	Displaying runtime.

OSD message	Description
RUN- TIME 879 H.	Displaying the total run time of the tile in hours.
RUN- TIME 99999	Run time exceeds 99.999 hours. (Buy a new Barco LED-wall).
RUN- TIME I2C- ERROR	I²C error occurred while reading the total run time of the tile.
SCRN- BRITNES 6500 NIT	Displaying screen brightness.
SER. NR. 01234 5679	Displaying the serial number of the controllers.
SER. NR. I2C- ERROR	Error occurs when reading serial number.
TEMP 5°C 41°F	Displaying temperature in controller.
TEMP I2C- ERROR	Error occurs when reading temperature.
TEMP CTRL 34°C 93°F	Displaying the temperature of the controller unit in degrees Celsius and degrees Fahrenheit.
TILE TYPE 2x5	Displaying Tile Unit type.
TR-20 0.02 BOOT 1.30	Displaying product name and software version.
HPOS I2C- ERROR	Error occurs when reading horizontal window.
V CTRL 1.50v 3.30v 5.00v	Displaying voltage (1.5v - FPGA; 3.3v – MCU; 5v -

OSD message	Description
V FREQ 60.10 HZ	Displaying vertical frequency.
V LINK 3.00v	Displaying voltage.
VPOS 288 → 360	Displaying the start pixel column and end pixel column of the tile in the complete LED-wall. The origin is always left top of the display.
VPOS I2C- ERROR	Error occurs when reading vertical window.
VPOS 36 - 73	Displaying vertical window.

11. SPECIFICATIONS OF THE SP-20 TILE

Overview

- Specifications of the SP-20 tile

11.1 Specifications of the SP-20 tile

Specifications of the SP-20 tile

Calibrated Brightness	7,600 NIT
Color Processing	16-bit
Contrast ratio	3,000:1
Dimensions	Width: 960mm / tile Height: 960mm / tile Depth: 250mm / tile
Hor. viewing angle	120°
LED configuration	1R,1G,1B (discrete)
LED density	7,500 LEDs / m²
Pixel pitch	20mm
Power	Average: 120W /tile Maximum: 370W /tile
Vert. viewing angle	-15°, +40°
Weight	55kg